RECORD OF DECISION

Chemsol, Inc. Superfund Site

Piscataway, Middlesex County, New Jersey

United States Environmental Protection Agency
Region II
New York, New York
September 1998

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Chemsol, Inc. Superfund Site
Piscataway, Middlesex County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's selection of a second remedial action to address soil and groundwater contamination at the Chemsol Site (the "Site"), in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA) [42 U.S.C. §9601-9675], and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan, as amended, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the remedy for this second operable unit of the Site.

The New Jersey Department of Environmental Protection (NJDEP) has been consulted on the planned remedial action in accordance with CERCLA §121(f) [42 U.S.C. §9621(f)]. NJDEP is not in agreement with EPA's soil cleanup goals but does not object to the groundwater component of the remedy, (see Appendix IV). The information supporting this remedial action is contained in the Administrative Record for the Site, the index of which can be found in Appendix III to this document.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Chemsol Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy is the second of three operable units planned for the Chemsol Site. The major components of the selected remedy include:

Soil

- Excavation and off-site disposal of approximately 18,500 cubic yards of soil contaminated with polychlorinated biphenyls (PCBs) above 1 part per million (ppm) and lead above 400 ppm. The excavated areas will be backfilled with clean imported fill from an off-site location, covered with topsoil, then seeded with grass.

- Disposal of the excavated soils at an appropriate off-site disposal facility, depending on waste characteristics.

Groundwater

- Installation and pumping of approximately five additional extraction wells to contain contaminated groundwater on-site.

- Continued treatment of extracted groundwater through the existing groundwater treatment facility. The treated groundwater may continue to be released to the Middlesex County Utilities Authority (MCUA). If discharge to the MCUA becomes infeasible, treated groundwater will undergo additional on-site biological treatment, prior to being released on-site to Stream 1A.

- Performance of an additional groundwater investigation to determine the extent to which contaminated groundwater is leaving the property boundaries.

Surface Water and Sediments

- Monitoring of sediments and surface water to determine whether remediation of Lot 1B will result in lower PCB levels in the on-site streams, Stream 1A and 1B, over time.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA §121 in that it: (1) is protective of human health and the environment; (2) complies with Federal and State requirements that are legally applicable or relevant and appropriate to the extent practicable given the unpredictable nature of groundwater hydrogeology in fractured bedrock; (3) is cost-effective; (4) utilizes alternative treatment (or resource recovery) technologies to the maximum extent practicable; and (5) satisfies the statutory preference for remedies that employ treatment to reduce the toxicity, mobility, or volume of the hazardous substances, pollutants or contaminants at the Site.

As part of this Record of Decision, EPA conducted a review of remedies selected at the Site consistent with CERCLA, Section 122(c), the National Contingency Plan, Section 300.430(f)(4)(ii) and OSWER Directives 9355.7-02 (1991), 2a(1994) and 3a (1995). EPA conducted a Type 1a review which is applicable to a site at which the remedial response is ongoing. I certify that the remedies selected for this Site remain protective of human health and the environment.

Because this remedy may result in hazardous substances remaining on the Site above health-based levels, a review will be conducted within five years after the initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

William J. Muszynski

Jeanne M. Fox
Regional Administrator

9/18/98
Date

RECORD OF DECISION

DECISION SUMMARY

Chemsol Site

Piscataway, Middlesex County, New Jersey

United States Environmental Protection Agency
Region II
New York, New York
September 1998

TABLE OF CONTENTS

SITE NAME, LOCATION AND DESCRIPTION

Site History

Chemsol, Inc. (Chemsol or Site) is located on a 40 acre tract of land at the end of Fleming Street, Piscataway, Middlesex County, New Jersey. The Site is comprised of two areas: an undeveloped parcel known as Lot 1A and a cleared area referred to as Lot 1B. Two small intermittent streams (Stream 1A and Stream 1B) and a small trench, known as the Northern Ditch, drain northward across the Site into a marshy wetland area located near the northeastern property boundary (see Figures 1 and 2).

Land use in the vicinity of the Site is a mixture of commercial, industrial, and residential uses. The Port Reading Railroad is directly south of the Site. Single family residences are located immediately to the west and northwest of the Site. An apartment complex with greater than 1,100 units is located to the north. Industrial and retail/wholesale businesses are located to the south and east of the Site.

Approximately 180 private wells at residential and commercial addresses were reported by the local health departments to be potentially active (i.e., not sealed) within a radius of two miles of the Site. Twenty-two of these wells are located at a distance less than ½ mile from the Site. The nearest public water supply well is over two miles away in the Spring Lake area of South Plainfield. No federally listed or proposed threatened or endangered species were found at the Site.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Chemsol operated as a solvent recovery and waste reprocessing facility in the 1950's through approximately 1964. Historically, the Site experienced numerous accidents, fires and explosions resulting from the storage, use or processing of flammable materials. In September 1958, a still exploded. In June 1964, a fire started when a 50-gallon drum of hexane exploded and in June 1962, a fire started when a pile of approximately 500,000 pounds of wax was ignited. In October 1964, a reaction between aluminum chloride and water generated hydrogen chloride gas resulting in the evacuation of the adjacent residential areas. Following this accident, Piscataway Township ordered the facility to cease operations. In 1978, the property was rezoned from industrial to residential. The Site is currently owned by Tang Realty Corporation. In September 1983, the Chemsol Site was formally placed on the National Priorities List (NPL) making it eligible for federal funds for investigation of the extent of contamination and for cleanup activities.

From 1983 to 1990, the New Jersey Department of Environmental Protection (NJDEP) directed Tang Realty, under various enforcement actions, to perform a series of Site investigations related to groundwater and soil contamination. Approximately 40 groundwater monitoring wells were installed on or in the vicinity of the Site by contractors for Tang Realty. Sampling results from these monitoring wells indicated that groundwater was contaminated with various volatile organic compounds (VOCs) including trichloroethylene, chloroform, chloroethane, toluene, carbon tetrachloride and methylene chloride. Furthermore, sampling and analyses of the soils (performed between 1980 and 1987) revealed the presence of polychlorinated biphenyls (PCBs) and other organic compounds.

In the summer of 1988, Tang Realty removed approximately 3,700 cubic yards of PCB-contaminated soils for off-site disposal. During the soils excavation, several thousand small (less than 1 gallon) containers of unknown substances were discovered. These unknown substances were stored in a trailer on-site. As a part of a U.S. Environmental Protection Agency (EPA) removal action undertaken in 1990 and 1991, these unknown substances were analyzed, grouped with other compatible Site wastes, and transported off-site. Approximately 10,000 pounds of crushed lab pack bottles, 13,500 pounds of hazardous waste solids, 615 gallons of hazardous waste liquids and 150 pounds of sulfur trioxide were disposed of off-site during the removal action. This removal action was completed in October 1991 by EPA.

In the fall of 1990, EPA and the NJDEP agreed that EPA should fund the remainder of the investigatory work. Subsequently, EPA initiated a Remedial Investigation and Feasibility Study (RI/FS) in order to assess the nature and extent of contamination at the Site and to evaluate remedial alternatives. EPA determined that the RI/FS would be performed in two phases. The first phase consisted of development of a Focused Feasibility Study (FFS) to evaluate the usefulness of an interim remedy to restrict off-site migration of contaminated groundwater. The second phase was to determine the nature and extent of contamination at the Site.

As part of the FFS, EPA sampled 22 on-site monitoring wells. The results of the FFS indicated that groundwater at the Site exists in a perched water zone (at depths of less than five feet), and also in the upper bedrock aquifer (to depths of at least 130 feet). Sampling results revealed that groundwater was highly contaminated with a wide variety of hazardous substances, including volatile organics, semi-volatile organics, as well as pesticides and inorganic compounds.

Based on the results of the FFS, EPA selected an interim remedy for the Chemsol Site in a Record of Decision (ROD) that was signed on September 20, 1991. The objective of this interim remedy was to restrict the migration of the contaminated groundwater until a more comprehensive Site-wide remedy could be selected and implemented. The interim remedy consisted of pumping groundwater from well C-1, a former monitoring well installed by Tang Realty's contractors found to be highly contaminated with VOCs. The pumped groundwater from C-1 would then be treated on-site through an air stripper, after which it would be filtered, followed by treatment by activated carbon and biological treatment. After treatment, the water was to be discharged to the on-site stream.

On March 9, 1992, EPA issued a Unilateral Administrative Order (UAO) to Tang Realty, Schering Corporation, Union Carbide Corporation and Morton International, Inc. (the Respondents) for performance of the interim remedy. Schering Corporation, Union Carbide Corporation and Morton International, Inc. were identified by EPA as potentially responsible for the contamination at the Site by having sent their waste to the Chemsol Site for reprocessing. Tang Realty was identified as the owner of the property.

In November 1993, the Respondents requested that the interim remedy be modified so that water from the treatment system could be discharged into the sewer system that leads to the Middlesex County Utilities Authority (MCUA), instead of into an on-site surface water body (Stream 1A), as specified in the ROD. As a result, in July 1994, EPA issued an Explanation of Significant Differences which modified the interim remedy to allow for discharge of treated groundwater to the sewer system. However, EPA also required that the Respondents design and build the biological portion of the treatment system so that, in the future, if the treated groundwater could not be sent to MCUA, the biological system could be brought quickly online to allow for direct discharge of treated groundwater to Stream 1A on-site.

Construction of the groundwater treatment plant was completed by the Respondents in June 1994 and the plant was brought into operation in September 1994. The well has been pumped at varying rates, averaging approximately 25 gallons per minute. The results of monthly monitoring indicate that the interim remedy has been effective in restricting the migration of highly contaminated groundwater from the Site. The second phase RI/FS for the Site was completed in June 1997.

Enforcement Activities

EPA initiated a Potentially Responsible Party (PRP) search by issuing Request for Information and Notice Letters in September 1990. Additional letters were issued in December 1991 and February 1992. Due to the need to restrict contaminated groundwater from migrating off the Site, an interim remedy was selected in a Record of Decision issued by EPA on September 20, 1991. A UAO was issued to four companies to design and construct the interim remedy. During the course of the performance of this UAO, EPA was notified that a PRP group had been formed and was assisting the UAO Respondents in financing the interim remedy. The UAO Respondents continue to operate the interim remedy, extraction and treatment system.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The second phase RI/FS report, the Proposed Plan and supporting documentation were made available to the public in the administrative record file at the Superfund Document Center in EPA Region II, 290 Broadway, New York, New York and the information repository at the Kennedy Library, 500 Hoes Lane, Piscataway New Jersey. The notice of availability for the above-referenced documents was published in the

Home News and Tribune on August 11, 1997. The public comment period which related to these documents was held from August 11, 1997 to September 10, 1997 and later extended to October 10, 1997.

On August 27, 1997, EPA conducted a public meeting at the Piscataway Municipal Complex. The purpose of this meeting was to inform local officials and interested citizens about the Superfund process, to review planned remedial activities at the Site, to discuss the Proposed Plan and receive comments on the Proposed Plan, and to respond to questions from area residents and other interested parties.
Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF THIS OPERABLE UNIT

This action is the second operable unit or phase taken to address the Site. The first operable unit consisted of an interim groundwater containment system which is currently operational at the Site. This action will address contaminated groundwater and soil within the Chemsol property boundaries. A third operable unit is planned to investigate the extent of groundwater contamination outside the property boundaries and to determine if any further groundwater remediation is necessary.

SUMMARY OF SITE CHARACTERISTICS

The second phase of the RI field work commenced in October 1992. The purpose of the RI was to accomplish the following: identify the nature and extent of contaminant source areas; define contamination of ground water, soils, surface water and sediment; characterize Site hydrogeology; and determine the risk to human health and the environment posed by the Site. The work was conducted by CDM Federal Programs Corporation under contract to EPA.

The results of the RI can be summarized as follows.

Soil Investigation

A soil sampling program was designed based on historical Site usage, aerial photographs and the findings of previous investigations. Samples were taken using an extensive grid system. Group A samples were collected at 200 foot grid spacing in Lot 1B and 400 foot grid spacing in Lot 1A. These samples were analyzed for a full range of organic and inorganic contaminants. Group B samples were collected from Lot 1B at 100 foot grid spacing and field screened for PCBs. Group C samples were collected from biased sampling locations based on aerial photographs and previous investigations and on a 50 foot grid spacing around those Group B samples which showed PCBs in their field screening results. In addition, samples from Lot 1B were analyzed using the Toxicity Characteristic Leaching Procedure (TCLP), a test which is used to determine whether a material is a hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA). Samples passing the TCLP test can be disposed at a facility which accepts non-hazardous waste, a so-called Subtitle D facility under RCRA. Subsurface soil samples were also taken from 102 locations across the Site.

The results of the RI show that the surface and subsurface soils in Lot 1A and Lot 1B contain various contaminants. The contaminants found were: VOCs, including carbon tetrachloride, trichloroethane, trichloroethene, tetrachloroethene, toluene, ethylbenzene, and xylenes; semi-volatile organic compounds (SVOCs), including polyaromatic hydrocarbons, phthalates, pesticides (such as aldrin, dieldrin, and DDE) and PCBs; and inorganics, including manganese and lead. The range of concentrations of certain contaminants detected in surface and subsurface soil is presented in Table 1. All the soil samples that were analyzed for TCLP, passed the TCLP test. Based on these data, EPA believes that all soils at the Site will pass the TCLP test.

Of the contaminants found, PCBs contributed the most to the risks at the Site (see the section entitled "Summary of Site Risk," below). The majority of PCB and lead contamination occurs in surface soils (0-2 feet depth), with the exception of one location where PCBs are found at a depth of 6 feet, near boring 76 (see Figure 3). The VOCs were found to be co-located with the PCBs and lead; therefore, any actions taken to address PCBs and lead would also address the VOCs.

Groundwater Investigation

As a part of the RI, additional groundwater monitoring wells were installed. Two rounds of groundwater sampling were performed during the RI. Samples were collected and analyzed from the 49 wells on the Site. EPA was initially unsuccessful in obtaining voluntary cooperation to install monitoring wells on properties adjacent to the Chemsol property. EPA continues to pursue this matter in order to facilitate further investigation of groundwater migration from the Site.

The geologic formation which underlies the Site is commonly referred to as the Brunswick formation and lies generally 3 to 14 feet below the ground surface. The Brunswick formation in general contains areas of red shale, gray shales and siltstones. A gray shale layer acts to preclude groundwater flow in some areas and separates the bedrock into an upper zone which is located above the gray shale, and a so-called "deep gray unit" bedrock zone. The Brunswick formation is overlain by a thin layer of overburden which consists of unconsolidated sand, silt, clay and cobble deposits and fill. This overburden was determined to be typically 3 to 6 feet thick at the Site.

Groundwater flow at the Site is complex. There is perched groundwater present in some areas of the overburden. However, the primary groundwater flow is through interconnected fractures in the bedrock. Due to the unpredictable nature and distribution of these fractures, the precise direction of flow and the rate of groundwater flow can be difficult to predict. In general, groundwater in the upper zone, above the gray shale, flows to the south. Below the gray shale, groundwater generally flows to the north. Near the southern boundary of the Site, groundwater is influenced by off-site commercial pumping activities to the south.

With regard to chemical contamination, the RI confirmed that well C-1 was by far the most contaminated of all on-site monitoring wells. The results also confirmed that VOCs are the primary contaminants in groundwater. The major VOC contaminants include benzene, carbon tetrachloride, chloroform, 1,2,-dichloroethane, 1,2-dichloroethene, tetrachloroethene, toluene and trichloroethene. The bedrock aquifer is contaminated far in excess of EPA's Safe Drinking Water Act maximum contaminant levels (MCLs) which are the federal regulatory standards for drinking water. The analytical results also indicate that MCLs for aluminum, iron and manganese have been exceeded in many wells at the Site. Although many pesticides were detected in the groundwater, no MCLs were exceeded. In the second round of sampling, PCBs slightly in excess of MCLs were found in two wells, C-1 and TW-4 (see Table 2).

Groundwater contamination is present in the bedrock aquifer at both the northern and southern boundaries of the Site. Evaluation of the hydrogeological data indicates that contaminated groundwater continues to migrate off-site. However, due to the influences of groundwater pumping from off-site sources and the limited amount of off-site groundwater sampling data, there remains uncertainty as to the extent of this migration. Additional off-site sampling is required to further define the extent and source of off-site contamination.

In addition to sampling activities, EPA's consultant used mathematical modeling to help determine the optimum pumping plan which would best capture contaminated groundwater and minimize the amount of contaminated groundwater which leaves the Site. The modeling showed that, by pumping five additional wells, the contamination could be contained on-site except possibly for the deep bedrock groundwater in the northwest corner of the Site.

In addition, during the RI, EPA conducted an assessment to determine whether contamination previously detected in the Nova-Ukraine section of Piscataway was related to the Chemsol Site. The Nova -Ukraine is a housing development whose nearest part is located approximately 900 feet south-southeast of the Chemsol Site. Residential wells in this development had been sampled several times since 1980 by various government agencies and private consultants. Due to concentrations of VOCs in the wells, NJDEP delineated an Interim Groundwater Impact Area for a portion of the Nova-Ukraine area. This delineation made residents eligible for financial assistance to connect to a public water supply. All but four residences elected to be connected to a public water supply. Based on the results of the RI, EPA does not believe that the groundwater contamination of residential wells in the Nova-Ukraine area is related to the Chemsol Site.

Surface Water and Sediment Investigation

The ground elevation at the Site is generally lower than the adjacent area. Surface water runoff is towards the Site during rain events. There are several wetland areas, one drainage ditch, and two streams present at the Site. During sampling for the FFS in 1991, Stream 1A was sampled and determined to be free of contamination from the Site. During the RI, two rounds of sampling were conducted in Stream 1B. Twelve sampling locations were selected. At each location, one surface water sample and two sediment samples were collected.

Surface water sampling has indicated that the Chemsol Site is contributing low levels of contamination including VOCs, pesticides and organics to Stream 1B (Table 3). However, low levels of pesticides and inorganics also appear to be entering the Site from off-site sources. Levels of several contaminants exceeded State Water Quality Criteria. As noted in the previous section, the area surrounding the Site contains many industrial/commercial establishments. Sediment sampling conducted in conjunction with the surface water sampling indicates the presence of VOCs, SVOCs, pesticides, PCBs and metals (Table 4).

SUMMARY OF SITE RISKS

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future Site conditions. The baseline risk assessment estimates the human health and ecological risk which could result from the contamination at the Site if no remedial action were taken.

<u>Human Health Risk Assessment</u>

To perform a Human Health Risk Assessment, the reasonable maximum human exposure is evaluated. A four-step process is then utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification*-- identifies the chemicals of potential concern at the Site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment*-- estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. *Toxicity Assessment*-- determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization*-- summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative (e.g., one-in-a-million excess cancer risk) assessment of site-related risks.

The baseline risk assessment began with selecting chemicals of potential concern which would be representative of the contamination found in various media (surface soil, subsurface soil, surface water, sediment, and groundwater) at the Site (See Table 5 - Chemicals of Potential Concern). Due to the large number of chemicals detected at the Site, only those chemicals which were thought to pose the highest risk (based on factors such as frequency of detection and concentration detected) were retained as chemicals of potential concern. The chemicals of potential concern include: benzo(a)pyrene, pesticides, PCBs and inorganics in surface soil; 1,1,2,2-tetrachloroethane, pesticides, PCBs, and inorganics in subsurface soils; VOCs and SVOCs in surface water; and, polyaromatic hydrocarbons, PCBs, and inorganics in sediment. Several of the contaminants of concern listed above are known or suspected of causing cancer in animals and/or humans or of causing non-cancer health effects in the liver, kidney, respiratory tract, and the central nervous system.

In the exposure assessment, the potential exposure for human exposure to the chemicals of concerns, in terms of the type, magnitude, frequency, and duration of exposure, is estimated. The assessment is made for potentially exposed populations at or near the property considering both the current situation and potential future conditions. Please see Table 6 for a listing of potential exposure pathways.

An important factor which drives the risk assessment is the assumed future use of the Site. Based on discussions with the town and the fact that the Site is now zoned for residential, rather than industrial use, EPA assumed that the most probable future use of the Site would be for residential or recreational purposes. The Town expressed a preference for recreational use as the property is one of the last parcels of open land available in the Township. The current land uses at this Site have the potential to impact nearby residents (adults and children) and possible trespassers onto the Site. In the future, it is possible that potential human receptors would include residents (adults and children), Site workers (employees), and construction workers.

Pathways of exposure evaluated for the Site include: 1) sediment and soil ingestion; 2) dermal contact with soil and sediment; 3) ingestion of contaminated groundwater and surface water; 4) dermal contact with surface water; and, 5) inhalation of VOCs and particulates during showering. Because EPA assumed a future residential/recreational land use of the Site, the list of possible human receptors identified in the exposure assessment included trespassers, residents (adults and children), Site workers (employees), and construction workers. Exposure intakes (doses) were calculated for each receptor for all pathways considered.

Potential carcinogenic risks are evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (Sfs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals (See Table 7). Sfs, which are expressed in units of [mg/kg-day] [-1] are, multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects a conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely.

EPA's acceptable cancer risk range is 10^{-4} to 10^{-6} which can be interpreted to mean that an individual may have a 1 in 10,000 to 1 in 1,000,000 increased chance of developing cancer as a result of Site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at the Site. The State of New Jersey's acceptable risk standard is one in one million (10^{-6}).

EPA found that contaminants in the surface soil at the Site posed an unacceptable total cancer risk of 2.2×10^{-3} (i.e., 2.2 in a thousand) to potential future residents through ingestion and dermal contact. In addition, ingestion and inhalation (during showering) of contaminants in groundwater also posed unacceptable cancer risks (maximum of 2.4×10^{-2}) (i.e., 2.4 in a hundred) to potential future residents. For Site workers only the groundwater ingestion pathway was evaluated. The contaminants found in the groundwater posed unacceptable cancer risks of 5.4×10^{-3} (i.e., 5.4 in a thousand) to Site workers. Benzene, carbon tetrachloride, vinyl chloride, chloroform, 1,1-dichloroethene, trichloroethene, 1,2-dichloroethane, and PCBs are the predominant contributors to the estimated cancer risk in groundwater. The other receptors/exposure routes including ingestion or direct contact with subsurface soil, and dermal contact with surface water and sediment) have estimated cancer risk within or below EPA's acceptable risk range.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, (see Table 8) based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects (see Table 9). RfDs, which are expressed in units of milligrams per kilogram per day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium (i.e., the hazard quotient equals the chronic daily intake divided by the RfD). The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impact a particular receptor population. An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. With regard to non-cancer effects, based on the calculated HIs, EPA found that several potential exposure pathways could have unacceptable health effects including: ingestion of surface soil by children (HI=6.2) (see Table 8); ingestion of disturbed surface soil along the current effluent discharge line by children (HI=3.7); inhalation of particulates along the current effluent discharge line by children (HI=1.5); ingestion of contaminated groundwater by adults and children (HI = 340 for adults and 800 for children); and, ingestion of contaminated groundwater by Site workers and construction workers (HI = 120 for Site workers and 17 for construction workers). No noncancer effects were associated with subsurface soils, surface water and sediment.

In summary, the Human Health Risk Assessment concluded that exposure to surface soil and ground water, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health or welfare. In contrast, exposure to subsurface soils, sediments, and surface water was determined not to pose a significant threat to human health.

Ecological Risk Assessment

A qualitative and/or semi-quantitative appraisal of the actual or potential effects of a hazardous waste site on plants and animals, constitutes an ecological risk assessment. A four-step process is utilized for assessing site-related ecological risks: *Problem Formulation* - a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. *Exposure Assessment* - a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. *Ecological Effects Assessment* - literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors. *Risk Characterization* - measurement or estimation of both current and future adverse effects.

The environmental evaluation focused on how the contaminants would affect the Site's natural resources. Natural resources include existing flora and fauna at the Site, surface water, wetlands and sensitive species or habitats. A wetlands delineation performed on-site determined that wetlands cover approximately 22 acres in Lot 1A and 3 acres in Lot 1B. Uplands in Lot 1A are wooded. No federally or State listed or proposed threatened or endangered flora or fauna are known to occur at or near the Site. However, white-tailed deer, woodchucks, rabbits, frogs, turtles and birds are known to inhabit the Site.

Sources of exposures to ecological receptors considered for this ecological assessment include surface soil (generally collected from 0 to 2 feet below ground surface), surface sediment (generally collected from 0-6 inches), and surface water. Data from subsurface soils (soils under pavements or from depths greater than 2 feet) were not evaluated. These depths are greater than those considered likely for potential contact with burrowing animals or roots of vegetation. Subsurface sediments (sediments from depths greater than 6 inches) also were not evaluated since fish and micro invertebrates are not likely to be exposed to contaminants at greater depths. Similarly, groundwater data were not used in this ecological assessment because it is unlikely that ecological receptors can contact contaminants associated with groundwater. Exposure may occur through: 1) ingestion of contaminated food items; 2) ingestion of contaminated surface water; 3) incidental ingestion of contaminated media (i.e., soil, sediment, or water ingested during grooming, eating, burrowing, etc.); 4) inhalation of contaminants; and, 5) adsorption upon contact with contaminated media.

Site surface soils were evaluated to assess terrestrial ecological risk from food chain transfer effects. Mathematical modeling was conducted to estimate exposure doses to representative mammalian and avian receptors (short-tailed shrew, American robin, and red-tailed hawk). A hazard quotient (HQ) approach was used to compare the calculated doses to reference toxicity values; a value exceeding unity (HQ > 1.0) indicates the potential for adverse ecological effects. The chemicals of concern selected for this evaluation included: toluene, carbon tetrachloride, 1,1,1-trichloroethene, chlorobenzene, xylenes, naphthalene, PCBs, pesticides, lead, and mercury.

Based on the terrestrial risk evaluation, the potential for adverse ecological effects exists for Lot 1A and Lot 1B. On Lot 1B, many of the contaminants greatly exceeded their respective reference toxicity values and require remediation. Lot 1B is also highly physically disturbed by development. On Lot 1A, the potential risk is from only a few contaminants that slightly exceed their respective reference toxicity values. Lot 1A exists in a relatively undisturbed state and is considered a locally valued habitat (i.e., predominantly forested wetland). Remedial action to address the potential risk assessed for Lot 1A would likely result in significant habitat disturbance or destruction. Therefore, it was determined that active remediation is not warranted in Lot 1A at this time to address terrestrial risk.

The assessment of aquatic risk evaluated the ecological significance of sediment contamination in Stream 1B and the associated ditch by comparing contaminant concentrations to ecologically-based screening values (D. Persaud, et al. August 1993. "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario." Ontario Ministry of Environment and Energy). Ecological risks in these sediments, while indicated, are considered minimal. Additionally, these areas may not represent actual sources of contamination, but may represent the presence of a migration pathway from the more heavily contaminated Lot 1B. Thus, while remediation of the Stream 1B and the ditch is not warranted at this time, they will be monitored to assess the affect of the remedial action in Lot 1B on contaminant levels.

The assessment of aquatic risk also evaluated the potential risk from surface water in Stream 1B. The potential risk is considered similar to the potential risk from sediment in that, while several contaminants exceed NJ State Surface Water Quality, the contaminants may be migrating from more heavily contaminated areas of the Site. Therefore, surface water is also included in the stream monitoring.

Uncertainties

The procedures and estimates used to assess risks, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure. Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the baseline risk assessment provides upper bound estimates of the risks to populations near the Site, and it is highly unlikely to underestimate those actual risks related to the Site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the RI report.

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the Risk Assessment.

The following objectives were established for the Chemsol Site:

(1) Restoring the soil at the Site to levels which would allow for residential/recreational use (without restrictions);

(2) augment the existing groundwater system to contain that portion of contaminated groundwater that is unlikely to be technically practicable to fully restore and restore the remaining affected groundwater to State and federal drinking water standards;

(3) remove and treat as much contamination as possible from the fractured bedrock;

(4) prevent human exposure to contaminated groundwater;

(5) prevent human exposure to surface soils contaminated with PCB concentrations above 1 part per million (ppm) and lead concentrations above 400 ppm; and

(6) eliminating, to the greatest extent practicable, continuing sources of contamination to the groundwater.

Soil cleanup levels for PCBs at the Site are based on the toxicity reassessment developed by EPA since the original 1990 EPA "Guidance on Remedial Actions for Superfund Sites with PCB Contamination". For residential land use, an action level of 1 ppm is specified for PCBs. The 400 ppm lead cleanup level is based on EPA's 1994 "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities." VOCs in soil were found to be co-located with the PCBs and lead; therefore EPA did not develop separate cleanup levels for VOCs in soil. EPA estimates that there are approximately 18,500 cubic yards of soil that contain PCBs at levels above 1 ppm and/or lead at levels above 400 ppm.

The State of New Jersey has developed State-wide soil cleanup criteria for several of the contaminants found at the Chemsol Site, including several VOCs, SVOCs, lead (400 ppm) and PCBs (0.49 ppm). Based on the data collected to date, in meeting EPA's cleanup levels for PCBs and lead cited previously, EPA believes the remedy will also achieve the State of New Jersey residential direct contact and impact to groundwater soil cleanup criteria. For instance, VOC and PCB contamination is concentrated in the areas around borings 74 and 76 and extends as deep as 6 feet in these locations. As these locations are excavated to achieve the 1 ppm action level for PCBs, it appears based on current data, that NJDEP's cleanup criteria of 0.49 ppm for PCB and its VOCs criteria may be achieved through the use of NJDEP's compliance averaging procedure.

The ultimate goal of the Superfund Program approach to groundwater remediation as stated in the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR part 300) is to return usable groundwater to their beneficial uses within a time frame that is reasonable. Therefore, for the Chemsol Site, the final groundwater remediation goals will be federal MCLs and State groundwater quality standards. Due to the complex geology and the possible presence of non-aqueous phase liquids at this Site, EPA believes that it may not be technically practicable to fully restore some portion of the contaminated on-site groundwater to federal and State standards. By law, any areas of contaminated groundwater which cannot be restored to meet federal and/or State groundwater standards require a waiver of such standards on the basis of technical impracticability. As will be discussed in subsequent sections, if after implementation of the remedy, it proves to be technically impracticable to meet groundwater quality standards, EPA will waive such standards for that portion of the plume that is found to be technically impracticable to remediate. Such a waiver would be documented in an Explanation of Significant Differences (ESD). A CEA would be established for the Site until such time that it can be shown that State groundwater quality standards are not exceeded. Performance data from any groundwater system selected for the Site would be used to determine the parameters and locations (both vertically and horizontally) which may require a technical impracticability waiver.

DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES

CERCLA §121(b)(1), [42 U.S.C. §9621(b)(1)] mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment which permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA §121(d), [42 U.S.C. §9621(d)], further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4),[42 U.S.C. §9621(d)(4)].

EPA's FS evaluated, in detail, four remedial alternatives for addressing soil contamination at the Site and three remedial alternatives for addressing groundwater contamination. Cost and construction time, among other criteria, were evaluated for each remedial alternative. The time to implement a remedial alternative reflects the estimated time required to construct the remedy. The estimates do not include the time to possibly negotiate with the potentially responsible parties, prepare design documents, or procure contracts.

The remedial alternatives are:

SOIL

Alternative S-1: No Further Action

Estimated Capital Costs:$388,660
Estimated Annual O&M Costs (30 years):$0
Estimated Total Present Worth Value:$388,660
Estimated Implementation Period:3-6 months

The Superfund process requires that the "no-action" alternative be considered as a baseline for comparison with other alternatives. Under Alternative S-1, EPA would take no action at the Site. However, the No-Action alternative includes, as with the other soil alternatives, a single sampling event for drummed waste and soil stockpiled at the Site, along with their transportation and off-site disposal. The drummed wastes were generated from the various investigations performed at the Site and the stockpiled soils were generated from construction activities performed at the Site. Since contaminants would remain on-site, institutional controls (e.g., a deed restriction) would be placed on the property that would restrict future use of the Site. Because this alternative would result in contaminants remaining on-site above health based levels, a review would be conducted within five years from initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Alternative S-2A: Capping with Soil

Estimated Capital Costs:$1,855,850
Estimated Annual O&M Costs (30 years):$2,000
Estimated Total Present Worth Value: $1,894,000
Estimated Implementation Period:3-6 months

Alternative S-2A includes the construction of a single layer (18 inches thick) soil cap covering 12 acres of the property which are contaminated above the soil cleanup levels. It would also require institutional controls to ensure that no intrusive activities would be performed on the capped area in the future since such activities would affect the cap's integrity. This alternative would allow for many recreational uses of the property, such as a park or playground, among others. A single sampling event of drummed waste and stockpiled soil along with their transportation and off-site disposal would be performed. Because this alternative would result in contaminants remaining on-site above health based levels, a review would be conducted within five years from the initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Alternative S-3: Excavation and Off-Site Disposal

Estimated Capital Costs: $5,573,001
Estimated Annual O&M Costs (30 years):$0
Estimated Total Present Worth Value:$5,573,000
Estimated Implementation Period:6-12 months

Alternative S-3 includes excavation and off-site disposal of all surface soils contaminated with PCBs and lead that are above EPA's cleanup levels. Approximately 18,500 cubic yards of soil with PCB levels greater than 1 part per million and lead levels greater than 400 parts per million will be trucked off-site and disposed of at a licensed and approved RCRA/TSCA (Toxic Substances Control Act) facility. The excavated areas would be backfilled with imported clean fill from an off-site location, and covered with topsoil and seeded with grass. The excavation and off-site disposal of the contaminated soils will allow for residential or recreational use of the Site in the future. As with Alternative S-1, this alternative includes a single sampling event of drummed waste and stockpiled soil prior to disposal off-site. Since this alternative would result in the removal of soils above EPA's cleanup levels no contaminants would remain in on-site soils above health-based levels and, therefore, five year reviews of the remedy would not be necessary.

Alternative S-4A: Excavation and On-Site Low Temperature Thermal Desorption of PCB-Contaminated Soil with Disposal of Lead Contaminated Soil.

Option-A [On-Site Solidification of Lead Contaminated Soil]
Estimated Capital Costs: $11,963,134
Estimated Annual O&M Costs (30 years):$0
Estimated Total Present Worth Value:$11,963,134
Estimated Implementation Period:3-6 months

For Option A, all surface soil contaminated with PCBs above 1 part per million (18,500 cubic yards) would be excavated. The excavated soil would be treated on-site by low temperature thermal desorption (LTTD) to remove PCBs and VOCs. The LTTD unit would be operated in compliance with the Clean Air Act (CAA), RCRA, and all applicable State regulations. The treated soil would then be backfilled to the excavated areas, topsoil would be placed on the treated soils and the area seeded. As with the other soil Alternatives, Alternative S-4A includes a single sampling event of drummed waste and stockpiled soil prior to disposal off-site.

The lead contaminated soils would be solidified/stabilized on-site by mixing with Portland cement. The area on-site where this contaminated soil is placed would be protected from future intrusions. Because this alternative would result in contaminants remaining on-site above health based levels, a review would be conducted within five years from initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Option-B [Off-Site Disposal of Lead Contaminated Soil]
Estimated Capital Costs:$12,241,639
Estimated Annual O&M Costs(30 years):$0
Estimated Total Present Worth Value:$12,242,000
Estimated Implementation Period:6-9 months

As in Option A, all surface soil contaminated with PCBs above 1 part per million (18,500 cubic yards) would be excavated. The excavated soil would be treated on-site by low temperature thermal desorption (LTTD) to remove PCBs and VOCs. The LTTD unit would be operated in compliance with the CAA, RCRA, and all applicable State regulations. The treated soil would then be backfilled to the excavated areas, topsoil would be placed on the treated soils and seeded. As with the other soil Alternatives, Alternative S-4B includes a single sampling event of drummed waste and stockpiled soil prior to disposal off-site.

Under Option B, the lead-contaminated soil would be excavated and transported off-site for disposal at a licensed and approved RCRA disposal facility. The excavated areas would be backfilled with clean fill, and seeded. Since this alternative would result in the removal of soils above EPA's cleanup levels no contaminants would remain in on-site soils above health-based levels and, therefore, five year reviews of the remedy would not be necessary.

GROUNDWATER

Alternative GW-1: No Action with Monitoring

Estimated Capital Costs:$0
Estimated Annual O&M Costs(30 years): $59,336
Estimated Total Present Worth Value:$912,000
Estimated Implementation Period:0 months

The Superfund program requires that a "No-Action" alternative be considered as a baseline for comparison with other alternatives. Under this alternative, EPA would cease actions at the Site to treat the contaminated groundwater and to restrict the off-site migration of contaminated groundwater. However, the No-Action alternative does include long-term monitoring. Because this alternative would result in contaminants remaining on-site above health based levels, a review would be conducted within five years from initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Alternative GW-2(A and B): Continue Existing Interim Action - Extract Groundwater from Well C-1

Option - A
Estimated Capital Costs:$ 45,097
Estimated Annual O&M Costs(30 years):$452,738
Estimated Total Present Worth Value:$7,000,300
Estimated Implementation Period:0 months

Under Option-A of this alternative, the current extraction of the groundwater from well C-1 would continue. The extracted groundwater first passes through an air stripper, after which it is filtered, followed by activated carbon adsorption. The treated water is then discharged to the Middlesex County Utilities Authority (MCUA) Publicly Owned Treatment Works (POTW). The treatment process generates a small quantity of non-bio-solids waste annually. The capital cost of $45,097 includes costs for replacing the existing pipeline (which carries water from well C-1 to the treatment plant) with an underground pipeline in order not to restrict the future uses of the property. This pumping is expected to continue until MCLs and State groundwater quality standards are reached in the plume. Because this alternative would result in contaminants remaining on-site above health based levels, a review would be conducted within five years from initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Also, a CEA would be established for the Site until such time that it can be shown that State groundwater quality standards are not exceeded.

Option - B
Estimated Capital Costs:$45,097
Estimated Annual O&M Costs(30 years):$726,336
Estimated Total Present Worth Value:$11,209,000
Estimated Implementation Period:3 months

In addition to the treatment described in Option-A, a biological treatment phase would be added for Option-B. This would be done by starting up the existing (currently unused) biological treatment plant. This phase is a contingency in the event that in the future, treated groundwater cannot be sent to MCUA. The biological treatment will provide additional treatment so the groundwater will achieve federal and State surface water quality standards which would allow for discharge to Stream 1A. The capital cost of $45, 097 includes costs for replacing the existing pipeline (which carries water from well C-1 to the treatment plant) with an underground pipeline in order not to restrict the future uses of the property. Because this alternative would result in contaminants remaining on-site above health based levels, a review would be conducted within five years from initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Also, a CEA would be established for the Site until such time that it can be shown that State groundwater quality standards are not exceeded.

Alternative GW-5(A and B): Extract Groundwater from Additional Wells - Use Existing Treatment Processes Air Stripping/Aerobic Mixed Growth

Biotreatment/Filtration/Activated Carbon Adsorption

__Option - A__
Estimated Capital Costs:$390,189
Estimated Annual O&M Costs(30 years):$670,892
Estimated Total Present Worth Value: $10,699,000
Estimated Implementation Period:3 months

Option-A of this alternative is almost identical to Alternative GW-2A. They differ in that, in addition to well C-1, groundwater would be pumped from other on-site wells. EPA cost estimates are based on pumping five additional wells. However, the number of wells to be pumped will be determined during the remedial design. Pumping from these additional wells will allow for more effective on-site containment of the plume, and also allow for groundwater extraction from other contaminated areas on-site. As in Alternative GW-2A, the treated groundwater would be discharged to MCUA POTW. The capital cost of $390,189 includes costs for replacing the existing pipeline (which carries water from well C-1 to the treatment plant) with an underground pipeline in order not to restrict the future uses of the property as well as costs associated with installation of additional extracting wells. Because this alternative would result in contaminants remaining on-site above health based levels, a review would be conducted within five years from initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Also, a CEA would be established for the Site until such time that it can be shown that State groundwater quality standards are not exceeded.

__Option - B__
Estimated Capital Costs:$390,189
Estimated Annual O&M Costs(30 years):$766,336
Estimated Total Present Worth Value:$12,169,000
Estimated Implementation Period:3 months

A biological treatment phase would be added for Option-B. This would be done by starting up the existing (currently unused) biological treatment plant. Use of the biological treatment phase would allow for discharge to Stream 1A in compliance with federal and State standards. The capital cost of $390,189 includes costs for replacing the existing pipeline (which carries water from well C-1 to the treatment plant) with an underground pipeline in order not to restrict the future uses of the property as well as costs associated with installation of additional extraction wells. Because this alternative would result in contaminants remaining on-site above health based levels, a review would be conducted within five years from initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Also, a CEA would be established for the Site until such time that it can be shown that State groundwater quality standards are not exceeded.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria are the most important and must be satisfied by any alternative in order to be eligible for selection:

1. *Overall protection of human health and the environment* addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with ARARs* addresses whether or not a remedy would meet all of the applicable (legally enforceable), or relevant and appropriate (pertaining to situations sufficiently similar to those encountered at a Superfund site such that their use is well suited to the site) requirements of federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:

3. *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. *Reduction of toxicity, mobility, or volume through treatment* refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants or contaminants at the site.

5. *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. *Implementability* refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. *Cost* includes estimated capital and operation and maintenance costs, and the present-worth costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

8. *State acceptance* indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the selected alternative.

9. *Community acceptance* refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include support, reservation, and opposition by the community.

A comparative analysis of the remedial alternatives based upon the evaluation criteria noted above follows:

Overall Protection of Human Health and the Environment

Soil

Alternative S-1, No Action, would not be protective of human health and the environment because the Site would remain in its current condition. The soils would continue to pose a threat to potential future residents, trespassers, potential ecological receptors and the environment. Therefore, Alternative S-1 has been eliminated from consideration and will not be discussed further.

Alternative S-2A relies on containment and institutional controls to provide protection over time. Deed restrictions would have to be enforced to ensure that the cap is not breached in the future in order for this alternative to be protective.

Upon completion of Alternative S-3 and Alternative S-4(A and B), the potential risks to human health and the environment from organic and inorganic contaminants would be minimized if not eliminated through off-site removal or treatment of contaminants in the surface soils to protective levels.

Groundwater

Alternative GW-1, No Action, would not be protective of human health and the environment because the groundwater would continue to migrate off-site continuing to pose a potential threat to users. Therefore, Alternative GW-1 has been eliminated from consideration and will not be discussed further.

Alternatives GW-2 (A and B) and GW-5 (A and B) would be protective of human health by controlling the migration of contaminated groundwater through pumping and by removing contaminants through treatment of pumped groundwater. GW-5 (A and B) captures and removes more contamination than GW-2 (A and B).

Compliance with ARARs

Soil

There are no chemical specific ARARs for soil. However, the State has developed State-wide soil cleanup criteria that while not legally applicable, were considered by EPA in selecting cleanup levels for the Site. If implemented, Alternatives S-3 and S-4(A and B) would meet location-specific and action-specific Federal and State ARARs for the contamination in the soils. The major ARARs for Alternative S-3 are Federal and State Resource Conservation and Recovery Act (RCRA) requirements which control the transportation and disposal of hazardous waste. For example, the soil excavated under Alternative S-3 would be disposed at a facility which is licensed under RCRA to accept hazardous waste. Alternatives S-4(A and B) would involve the use of an on-site treatment technology which would be subject to RCRA treatment regulations and Clean Air Act requirements regarding emissions from the treatment system. Air emissions will require air permit equivalences from the State of New Jersey. In addition, because a portion of the Site is classified as wetlands, all alternatives (soil and/or groundwater) would need to comply with Section 404 of the Clean Water Act and federal Executive Order 11990 which requires federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. A wetland restoration and monitoring plan will be prepared as a part of the remedial design plan to address potential impact to the wetlands, such as groundwater drawdown.

Groundwater

Alternatives GW-2 (A and B) and GW-5(A and B) would meet the chemical-specific ARARs for the treated water before discharge. These include New Jersey Pollutant Discharge Elimination System requirements for discharges to surface water. In addition, air emissions from the treatment plant would need to comply with Federal and State emissions standards. Alternatives GW-2(A and B) and GW-5(A and B) produce a non-hazardous filter cake. Also, a CEA would be established for the Site until such time that it can be shown that State groundwater quality standards are not exceeded.

Alternative GW-5(A and B) is more likely to achieve State and federal water quality standards in the aquifers than is GW-2, because GW-5(A and B) would utilize several wells to extract contaminated groundwater from the aquifer whereas GW-2 would utilize only one extraction well. The additional extraction will provide greater capture of contaminants and therefore increase the likelihood of achieving State and federal water quality standards. It is possible that it will be technically impracticable to restore all portions of the aquifers to meet State and federal standards. Any areas of contaminated groundwater which cannot be restored to meet State and/or federal groundwater quality standards require a waiver of such standards on the basis of technical impracticability. If after implementation of the remedy, it proves to be technically impracticable to meet water quality standards, EPA would waive such standards. Performance data from any groundwater system selected for the Site would be used to determine the parameters and locations (both vertically and horizontally) which may require a technical impracticability waiver.

Remedial activities for groundwater at the Site may disturb or impact wetlands. Impacts may include groundwater drawdown or alteration of the hydrologic characteristic of the area, as well as improvement or installation of wells. These potential impacts will be considered in the remedial design report.

Long-Term Effectiveness and Permanence

Soil

Alternatives S-4(A and B) provide the highest degree of long-term effectiveness and permanence since the waste would be treated to permanently remove organic contaminants. Alternative S-3 provides a high degree of long-term effectiveness by removing waste from the Site but does not provide a high degree of permanence since waste would not be destroyed but only contained off-site.

Under Alternative S-2A, contaminated soils would remain on-site and, therefore, this remedy would provide the least amount of long-term effectiveness and permanence. In addition, institutional controls would need to be employed and enforced in order to ensure effectiveness.

Groundwater

Alternatives GW-2(A and B) and GW-5(A and B) provide varying amounts of containment of the contaminated groundwater. Additional off-site investigations to determine the extent of groundwater contamination are necessary to ensure that risks to neighboring communities are minimized. Alternatives GW-5 (A and B) provide a higher degree of long-term effectiveness than Alternatives GW-2 (A and B) by capturing a larger mass and volume of contaminants in the groundwater. The on-site treatment facility will therefore treat a greater quantity of contaminated groundwater and remove a larger mass of contaminants from the extracted groundwater. The additional extraction wells would also better contain the plume on-site.

Short-Term Effectiveness

Soil

Alternatives S-2A, S-3, and S-4(A and B) do involve construction activities that would pose a low level risk of exposure to soils by ingestion, direct contact and inhalation to Site workers; however this risk can be managed by appropriate health and safety measures. All of the alternatives can be implemented relatively quickly, in less than a year following completion of design.

Alternative S-3 involves a significant increase in dust, vapor, and noise generation during soil excavation. These would be minimized through the use of measures which would be undertaken to ensure that all activities are performed in such a way that vapors, dust, and other materials are not released to the surrounding community during excavation. In addition, Alternative S-3 includes off-site transportation of the excavated soils. This will increase truck traffic and noise in the community during the period when soil is being transported off-site. Transportation flow patterns will be designed to minimize traffic impacts on the community. This may entail constructing a road from the Site which will bypass residential areas.

Under Alternative S-4(A and B), a thermal desorber would be placed on-site, causing increases in noise and emissions from the unit. To minimize the risk from inhalation of vapors from the thermal desorber which is required, a secondary chamber would be utilized that would oxidize all organic compounds released from the LTTD process to carbon dioxide, water and hydrochloric acid.

Groundwater

All the groundwater alternatives provide short-term effectiveness in protecting the Site workers and neighboring communities from the risks due to ingestion and inhalation of VOCs. Alternatives GW-2(A and B) and GW-5(A and B) would pose a low level risk to Site workers during construction; however, this risk can be managed by the use of appropriate health and safety measures. Alternative GW-2 is a continuation of the existing system and is running now. Alternatives GW-5 (A and B) can be implemented very quickly (in approximately 3 months) since they are simply an addition to the current system.

Reduction of Toxicity, Mobility or Volume Through Treatment

Soil

Alternatives S-4(A and B) provide for physical removal of the contaminated material and the maximum reduction in toxicity and mobility through treatment. Alternative S-2A and Alternative S-3 do not include the use of treatment to reduce the toxicity, mobility or volume of contaminated soil. For Alternative S-2A, reduction in the mobility of the contamination would be achieved through the use of containment. For Alternative S-3, reduction in toxicity, mobility and volume would be achieved through excavation and off-site disposal rather than through treatment.

Groundwater

Alternatives GW-2(A and B) and GW-5(A and B) reduce the toxicity and volume of contamination from the extracted groundwater. However, Alternative GW-5(A and B) would operate at approximately twice the pumping rate of Alternative GW-2(A and B). The mobility of the contaminants is completely controlled by the pump-and-treat alternatives to the extent that the groundwater is within the capture zone of the wells. Greater reduction of volume and toxicity of contaminated groundwater is achieved by GW-5 than GW-2. Alternative GW-5 also results in greater capture and containment of contaminated groundwater.

Implementability

Soil

All of the services and materials needed to implement the soil alternatives are readily available commercially. Each alternative utilizes standard technologies for excavation, capping and transportation of soils. However, due to the high demand for thermal desorption units, there may be a delay in implementing Alternative S-4 (A and B). All the alternatives are technically feasible but Alternatives S-4(A and B) require a treatability study to obtain design parameters for the full-scale system. Alternatives S-4(A and B) have complex administrative issues because of the quantity of equipment that needs to be set up at the Site and the need to provide substantive compliance with State air emissions permit requirements. Alternative S-3 is easily implementable using standard excavation technology. If possible, a temporary access road that would provide more direct access from the Site to nearby highways, would be built, in order to minimize the number of trucks traveling through the community. Engineering controls are readily implementable to minimize air borne dust and contaminants for all excavation activities. If necessary, a small pilot-scale study will be undertaken to help in estimating the ambient air impact for soil excavation at the Site.

Groundwater

All of the services and materials needed to implement the groundwater alternatives are readily available commercially. All the alternatives are technically feasible but Alternatives GW-2(A and B) and GW-5(A and B) require skilled operators to successfully implement the remedy. The alternatives are also feasible from an administrative standpoint. The required activities for the pump-and-treat would occur on Chemsol property. The treatment plant for the interim remedy has already been built and has been in operation for the last three years with discharge to the MCUA POTW. The effluent line for the discharge to Stream 1A has also been installed even though it is not currently being used.

All the services needed to implement the alternatives already exist. The pump-and-treat alternatives require the most services since they require operation of the treatment plant and disposal of filtered waste from the plant.

Costs

The capital, annual operation and maintenance, and present worth costs are presented in Tables 10 and 11, (Appendix II). Present worth costs for all the alternatives were calculated assuming a 5% interest rate and a 30-year operation and maintenance period.

Soil

Capital costs for Alternative S-1 are estimated to be $338,660 which includes costs for a single sampling event of drummed waste and stockpiled soils along with transporting and off-site disposal of the drummed waste and the stockpiled soil. There would be no operation and maintenance costs so that the total present worth is estimated to be $338,660.

Capital costs for Alternative S-2A are estimated to be $1,855,850. This includes the costs of the sampling and off-site disposal described for Alternative S-1 plus the costs of constructing and seeding the soil cap. Annual operation and maintenance costs are estimated to be $2,000. The total present worth is estimated to be $1,894,000.

Capital costs for Alternative S-3 are estimated to be $5,573,000. This includes the costs of the sampling and off-site disposal described for Alternative S-1 plus the costs of excavating and disposing of the contaminated soils off-site. There are no annual operation and maintenance costs so that the total present worth is estimated to be $5,573,000.

Capital costs for Alternative S-4A are estimated to be $11,963,134. This includes the costs of the sampling and off-site disposal described for Alternative S-1 plus the costs of excavating and treating the contaminated soils on-site. There are no annual operation and maintenance costs since the treatment would be accomplished in less than a year so that the total present worth is estimated to be $11,963,134.

Capital costs for Alternative S-4B are estimated to be $12,241,639. This includes the costs of the sampling and off-site disposal described for Alternative S-1 plus the costs of excavating and treating the contaminated soils on-site and disposing the lead-contaminated soils off-site. There are no annual operation and maintenance costs since the work would be accomplished in less than a year so that the total present worth is estimated to be $12,242,000.

Groundwater

In the case of all groundwater alternatives, the costs (Table 11, Appendix II) are in addition to those already incurred to install and operate the existing interim extraction and treatment system at the Site.

Alternative GW-1 does not have any capital cost. The annual operation and maintenance costs are estimated to be $59,336 and include costs for monitoring the groundwater. The total present worth cost is estimated to be $912,000.

Capital costs for Alternative GW-2A are estimated to be $45,097. These costs include costs associated with installation of underground piping from well C-1 to the treatment plant. The annual operation and maintenance costs are estimated to be $452,738. The total present worth is estimated to be $7,000,300.

Capital costs for Alternative GW-2B are estimated to be $45,097 and include costs associated with installation of underground piping from well C-1 to the treatment plant. Annual operation and maintenance costs are estimated to be $726,336. The total present worth is estimated to be $11,209,000.

Capital costs for Alternative GW-5A are estimated to be $390,189 and include costs associated with installation of underground piping from well C-1 to the treatment plant and costs for installing piping to five additional extraction wells. Annual operation and maintenance costs are estimated to be $670,892. The total present worth is estimated to be $10,699,000.

Capital costs for Alternative GW-5B are estimated to be $390,189 and include costs for installing piping to five additional extraction wells. Annual operation and maintenance costs are estimated to be $766,336. The total present worth is estimated to be $12,169,000.

State Acceptance

The NJDEP will not concur with this ROD. This stems from the fact that EPA's residential cleanup level for PCBs in soil is 1 ppm while NJDEP's residential cleanup criterion is 0.49 ppm. NJDEP cannot concur with the ROD unless it specifically requires institutional controls if the Site is not remediated to the NJDEP's 0.49 ppm residential use criterion for PCBs. However, NJDEP does not object to EPA's groundwater remedy.

Community Acceptance

EPA solicited input from the community on the remedial alternatives proposed for the Chemsol Site. While the community is supportive of EPA's preferred remedy, some citizens have indicated their preference for EPA to cleanup the soils at the Site to NJDEP cleanup criteria of 0.49 ppm for PCBs, instead of EPA's cleanup level of 1 ppm. The attached Responsiveness Summary addresses the comments received during the public comment period.

SELECTED REMEDY

Based upon consideration of the results of the RI/FS, the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA has determined that Alternative S-3 and Alternative GW-5 are the appropriate remedies for the Site, because they best satisfy the requirements of CERCLA §121 and the NCP's nine evaluation criteria for remedial alternatives, 40 CFR §300.430(e)(9). This remedy is comprised of the following components:

Soil

- Excavation and off-site disposal of approximately 18,500 cubic yards of contaminated soil with PCBs above 1 part per million (ppm) and lead above 400 ppm. The excavated areas will be backfilled with clean imported fill from an off-site location, covered with topsoil, then seeded with grass.

- Disposal of the excavated soils at an appropriate off-site disposal facility, depending on waste characteristics.

Groundwater

- Installation and pumping of additional extraction wells to contain contaminated groundwater on-site.

- Continued treatment of extracted groundwater through the existing groundwater treatment facility. The treated groundwater may continue to be released to the Middlesex County Utilities Authority (MCUA), if not, will undergo on-site biological treatment, prior to being released on-site, to Stream 1A.

- Perform an additional groundwater investigation to determine if contaminated groundwater is leaving the property boundaries.

Surface Water and Sediments

- Monitoring of sediments and surface water to determine if remediation of Lot 1B results in lower PCB levels in the on-site streams, Stream 1A and 1B over time.

The selection of this remedy is based on the comparative analysis of the alternatives discussed above and provides the best balance of tradeoffs with respect to the nine evaluation criteria.

STATUTORY DETERMINATIONS

As was previously noted, CERCLA §121(b)(1), mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA §121(d), further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4).

For the reasons discussed below, EPA has determined that the selected remedy meets the requirements of CERCLA §121.

<u>Protection of Human Health and the Environment</u>

The selected soil remedy protects human health and the environment by removing contaminated surface soils (0-2 feet depth) for off-site disposal. In addition, borings 74 and 76 with PCB contamination down to 6 feet depth, will also be excavated. Such excavation may also enable the NJDEP soil cleanup criteria to be achieved through soil compliance averaging. All excavated soils will be disposed of off-site at an appropriate disposal facility, depending on the characteristics of the soils.

The selected groundwater remedy will be protective of human health and the environment by controlling the migration of contaminated groundwater through pumping and the removal of contaminants through treatment of the pumped groundwater. This action will contain the highly contaminated groundwater on-site as well as provide for removal of contaminants, through treatment.

Compliance with ARARs

As part of the selected remedy, contaminated soils will be excavated and disposed of off-site. There are no chemical specific ARARs for soil. However, EPA and the State have promulgated guidances that while not legally applicable, were considered by EPA in establishing cleanup levels for the Site. The selected soil remedy will meet location - specific, and action-specific federal and State ARARs. Chemical-specific ARARs include: the Clean Air Act of 1976 which governs emissions resulting from excavation and off-site disposal of soils and Section 112 of the Clean Air Act which defines National Emissions Standards for Hazardous Air Pollutants (NESHAPs) (See Table 12).

Location-specific ARARs for the selected soil remedy include: Executive Order 11990 (Wetlands Protection); the Wetlands Construction and Management Procedures (40 CFR, Appendix A); Executive Order 11988 (Floodplain Management); and, the National Historic Preservation Act of 1966. Since a portion of the Site is classified as wetlands, the soil remedy needs to comply with Section 404 of the Clean Water Act and federal Executive Order 11990 which requires federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Any actions which disturb or impact wetlands would additionally require development of a wetland mitigation plan.

Action-specific ARARs for the soil remedy include: portions of the Resource Conservation and Recovery Act and its implementing regulations, specifically those portions dealing with the transportation, storage and disposal (including land disposal) of hazardous wastes and Department of Transportation requirements governing the off-site transport of hazardous materials.

As far as the selected groundwater remedy, the major chemical-specific ARARS are the Safe Drinking Water Act (SDWA) Maximum Contaminant Levels(MCLs) and the New Jersey Groundwater Quality Standards. For a given contaminant, at the conclusion of the groundwater remedy, groundwater in the aquifer at the Site boundaries should meet either the MCL or the Groundwater Quality Standard, whichever is more stringent (see Table 2). However, it is possible that the selected groundwater remedy will not meet chemical-specific ARARS for the organic contaminants in all groundwater beneath the Site. The water quality in the fractured bedrock aquifer is not expected to be restored to below MCLs or background levels for at least several decades due to the potential presence of DNAPLs. Any areas of contaminated groundwater which cannot be restored to meet State and/or federal groundwater quality standards (see Table 2) would require a waiver of such standards on the basis of technical impracticability. If after implementation of the remedy, it proves to be technically impracticable to meet the ARARS in Table 2, EPA would waive such standards. Performance data from the groundwater system would be used to determine the parameters and locations (both horizontally and vertically) which require such a technical impracticability waiver. Extracted groundwater would be treated to meet federal and State ARARS related to discharge of treated groundwater such as National Pollutant Discharge Elimination System (NPDES) and New Jersey Pollutant Discharge Elimination System (NJPDES) requirements.

Location-specific ARARS include for the selected groundwater remedy include: Executive Order 11990 (Wetlands Protection); the Wetlands Construction and Management Procedures (40 CFR, Appendix A); Executive Order 11988 (Floodplain Management); and, the National Historic Preservation Act of 1966. Since a portion of the Site is classified as wetlands, the groundwater remedy would comply with Section 404 of the Clean Water Act and federal Executive Order 11990 which requires federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Any actions which disturb or impact wetlands would additionally require development of a wetland mitigation plan.

Action-specific ARARS for the groundwater remedy include: portions of the Resource Conservation and Recovery Act and its implementing regulations, specifically those portions dealing with the transportation, storage and disposal (including land disposal) of hazardous wastes.

Cost Effectiveness

The selected soil remedy is cost-effective as it has been determined to provide the greatest overall long-term and short-term effectiveness in proportion to its present worth cost, $5.6 million with no annual operation and maintenance. Alternative S-4(A and B) would provide an equivalent level of protection, but at almost twice the cost [$11.96 - $12.24] million. Alternative S-2A (Capping with Soil), is estimated to cost $1.9 million, which is less than the selected remedy, but since contamination would be left on Site, Alternative S-2A would not provide a high degree of long-term effectiveness.

The selected groundwater remedy is cost-effective as it has been determined to provide the greatest overall long-term and short-term effectiveness. Even though the selected remedy, GW-5, has a higher O&M cost than GW-1 and GW-2, the pumping of these additional groundwater extraction wells allows for more effective on-site containment of the plume and also allows for groundwater extraction from other contaminated areas on-site.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected soil and groundwater remedies represent the maximum extent to which permanent solutions and alternative treatment technologies can be utilized in a cost-effective manner for the Chemsol Site. Furthermore, the selected remedies provide the best balance of tradeoffs with respect to the nine evaluation criteria.

Preference for Treatment as a Principal Element

The selected groundwater remedy satisfies the statutory preference for treatment as a principal element. The selected remedy utilizes treatment to reduce levels of contamination in groundwater to achieve ARARs, to the extent practicable. The activated carbon in the extracted groundwater are either destroyed by catalytic oxidation or are collected on liquid phase carbon which are later regenerated. Regeneration of the carbon converts the organic contaminants to carbon dioxide, water and hydrochloric acid, thereby eliminating the toxicity.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Site was released to the public in August 1997. This Plan identified Alternative S-3 as the preferred alternative to address the soil contamination and Alternative GW-5 as the preferred alternative to address the groundwater contamination at the Chemsol, Inc. Site. Upon review of all comments submitted, EPA determined that no significant changes to the selected remedy, as it was presented in the Proposed Plan, were necessary.

APPENDIX II

TABLES

TABLE -1 CONTAMINANTS IN SURFACE AND SUBSURFACE SOILS		
Contaminants	**Concentrations Surface Soil (parts per billion)**	**Concentrations Subsurface Soil (parts per billion)**
VOLATILE ORGANICS		
Carbon Tetrachloride	0 - 5,000	680-1700
Trichloroethene	3,500 - 32,000	3 - 18,000
Tetrachlorothene	0 - 7,000	2 - 12,000
1,1,2,2. - Tetrachlorethane	15 - 110	4 - 9,000
Chlorobenzene	0 - 3,300	4 - 8,300
Xylene (Total)	56,000 - 110,000	2 - 40,000
Toluene	2 - 380,000	10 - 27,000
Ethybenzene	2,900 - 15,000	8 - 8,800
SEMI-VOLATILES		
Bis(ethylhexyl) phthalate	0 - 63,000	66 - 17,000
Naphthalene	29 - 18,000	44 - 3,800
1,2,-Dichlorobenzene	200 - 1,600	34 - 10,000
PESTICIDES/PCB		
Aldrin	58 - 8,300	0.3 - 2,000
Dieldrin	43 - 13,000	1.1 - 130
4,4-DDE	0 - 4,600	0.13 - 120
Toxaphene	0 - 3,400	--
PCBs	540 - 310,000	21 - 2,600
INORGANICS		
Manganese	30.4 - 1,840 (parts per million)	282 - 2,300 (parts per million)
Lead	7 - 1,920 (parts per million)	2.4 - 914 (parts per million)

TABLE - 2 CONTAMINANTS IN GROUNDWATER			
Contaminants	**Concentrations (parts per billion)**	**Federal MCLs (parts per billion)**	**State of New Jersey Water Quality Standards (parts per billion)**
VOLATILE ORGANICS			
Carbon Tetrachloride	2 - 35,000	5	2
Trichloroethene	0.9 - 180,000	5	1
Tetrachloroethene	1 - 5,700	5	1
Chlorobenzene	4 - 4,200	100	4
Xylene (Total)	1 - 5,700	10	44
Toluene	2 - 27,000	1,000	1,000
Ethylbenzene	11 - 1,600	700	700
Vinyl Chloride	3 - 3,310	2	2
Benzene	1 - 16,000	5	1
2-Butanone	270 - 21,000	NA	NA
Chloroform	1 - 55,000	80**	100*
1,2-Dichloroethene	0.5 - 39,000	70-100***	10
SEMI-VOLATILES			
1,2-Dichlorobenzene	2 - 3,300	600	600
PCBs	0 - 10	0.5	0.5
INORGANICS			
Manganese	6.1 - 19,100	50	50
Aluminum	63.9 - 61,000	50-200	50-200

NA - Not available for this constituent
* - MCL is for Trihalomethanes
** - Proposed
*** - [cis-70 ppb, trans-100ppb]

TABLE 3

SUMMARY OF CHEMICALS IN SURFACE WATER

TABLE 3

CHEMSOL, INC SITE
SUMMARY OF CHEMICALS IN SURFACE WATER
ON SITE
CONCENTRATION (ug/l)

	Frequency of Detection	Range of Detected Concentrations Minimum	Maximum	Location of Maximum	Range of Non Detect Concentrations Minimum	Maximum
CHEMICALS						
VOCs						
Vinyl Chloride	2/14	11 0	18 0	C2 SW 05	10 0 U	10 0 U
Methylene Chloride	1/14	10 0	10 0	C2 SW 08	10 0 U	10 0 U
1,1 Dichloroethane	1/14	12 0	12 0	C2 SW 08	10 0 U	10 0 U
1,2 Dichloroethene (Total)	5/14	0 50 J	120	C2 SW 08	10 0 U	10 0 U
Chloroform	5/14	2 00 J	17 0	C1 SW 09	10 0 U	22 0 U
1,2 Dichloroethane	1/14	18 0	18 0	C2 SW 08	10 0 U	10 0 U
1,1,1 Trichloroethane	1/14	16 0	16 0	C2 SW 08	10 0 U	10 0 U
Bromodichloromethane	3/14	1 00 J	7 00 J	C1 SW 09	10 0 U	10 0 U
1,2 Dichloropropane	1/14	1 00 J	1 00 J	C1 SW 05	10 0 U	10 0 U
Trichloroethene	3/14	8 00 J	29 0	C2 SW 08	10 0 U	10 0 U
Dibromochloromethane	1/14	1 00 J	1 00 J	C1 SW 09	10 0 U	10 0 U
Benzene	2/14	9 00 J	14 0	C2 SW 05	10 0 U	10 0 U
Toluene	3/14	0 30 J	35 0	C2 SW 05	10 0 U	10 0 U
Chlorobenzene	2/14	9 00 J	17 0	C2 SW 05	10 0 U	10 0 U
Ethylbenzene	1/14	13 0	13 0	C2 SW 05	10 0 U	10 0 U
Xylenes (Total)	2/14	0 60 J	32 0	C2 SW 05	10 0 U	10 0 U
SVOCs						
1,2 Dichlorobenzene	1/14	4 00 J	4 00 J	C2 SW 05	10 0 U	11 0 U
Naphthalene	1/14	2 00 J	2 00 J	C2 SW 05	10 0 U	11 0 U
Di n octylphthalate	4/14	0 60 J	2 00 J	C2 SW 08	10 0 U	11 0 U

<u>Sample Group.</u>
C1 SW 03 AV, C1 SW 04, C1 SW 05, C1 SW 06 C1 SW 07, C1 SW 08, C1 SW 09, C2 SW 03 AV, C2 SW 04, C2 SW 05, C2 SW 08, C2 SW 10, C2 SW 11, C2 SW 12

TABLE 3(cont'd)

CHEMSOL, INC SITE
SUMMARY OF CHEMICALS IN SURFACE WATER

ON SITE

CONCENTRATION (ug/l)

	Frequency of Detection	Range of Detected Concentrations Minimum	Maximum	Location of Maximum	Range of Non Detect Concentrations Minimum	Maximum
CHEMICALS						
PESTICIDES/PCBs						
Lindane (Total)	3/14	0.01 J	0.01 J	C2 SW 08	0.05 U	0.06 U
Heptachlor Epoxide	1/12	0.01 J	0.01 J	C2 SW 05	0.05 U	0.06 U
Endosulfan I	1/14	0.03 J	0.03 J	C2 SW 06	0.05 U	0.06 U
Endosulfan II	1/14	0.01 JN	0.01 JN	C2 SW 12	0.10 U	0.11 U
4,4' DDT	1/14	0.01 J	0.01 J	C2 SW 08	0.10 UJ	0.11 U
INORGANICS						
Aluminum	14/14	62.8 B	5,130 J	C1 SW 07	-	-
Arsenic	3/14	2.60 BJ	5.90 BJ	C1 SW 08	1.90 UJ	2.00 UJ
Barium	14/14	27.8 B	150 B	C1 SW 08	-	-
Cadmium	4/14	1.20 BJ	6.70 J	C1 SW 07	1.40 UJ	1.60 U
Calcium	14/14	12,900 J	47,800 J	C2 SW 12	-	-
Chromium	1/14	10.4 J	10.4 J	C1 SW 07	2.60 UJ	4.20 U
Cobalt	4/14	1.08 B	13.3 BJ	C1 SW 07	1.30 UJ	3.20 UJ
Copper	4/14	1.48 BJ	32.5 J	C1 SW 07	1.90 U	4.90 UJ
Iron	14/14	125 J	13,700 J	C1 SW 08	-	-
Lead	14/14	1.73 BJ	189 J	C1 SW 07	-	-
Magnesium	14/14	4,260 B	11,900 J	C2 SW 12	-	-
Manganese	14/14	17.9 J	3,100 J	C1 SW 07	-	-
Mercury	2/14	0.17 B	0.30 J	C1 SW 07	0.10 UJ	0.10 UJ
Nickel	2/14	4.00 BJ	6.90 BJ	C1 SW 07	2.60 UJ	5.40 UJ
Potassium	14/14	1,150 B	16,700 J	C2 SW 12	-	-
Selenium	1/14	3.40 J	3.40 J	C1 SW 07	2.90 UJ	3.80 UJ
Sodium	14/14	9,680	27,000	C2 SW 06	-	-
Vanadium	2/14	8.10 B	34.5 BJ	C1 SW 07	2.50 UJ	4.00 UJ
Zinc	8/8	9.80 B	196 J	C1 SW 07	-	-

Sample Group.
C1 SW 03 AV, C1 SW 04, C1 SW 05, C1 SW 06, C1 SW 07, C1 SW 08, C1 SW 09, C2 SW 03 AV, C2 SW 04, C2 SW 05, C2 SW 06, C2 SW 10, C2 SW 11, C2 SW 12

TABLE 3 (cont'd)

CHEMSOL, INC SITE
SUMMARY OF CHEMICALS IN SURFACE WATER

UPSTREAM (OF THE SITE)

CONCENTRATION (ug/l)

	Frequency of Detection	Range of Detected Concentrations Minimum	Maximum	Location of Maximum	Range of Non Detect Concentrations Minimum	Maximum
CHEMICALS						
VOCs						
Acetone	1/3	5 00 J	5 00 J	C1 SW 02	10 0 U	10 0 U
SVOCs						
Phenanthrene	1/3	0 50 J	0 50 J	C2 SW 01	10 0 U	10 0 U
Di n butylphthalate	1/3	0 50 J	0 50 J	C1 SW 02	10 0 U	10 0 U
Fluoranthene	1/3	0 90 J	0 90 J	C2 SW 01	10 0 U	10 0 U
Pyrene	1/3	0 90 J	0 90 J	C2 SW 01	10 0 U	10 0 U
Bis(2 ethylhexyl)phthalate	2/3	0 60 J	0 70 J	C2 SW 01	10 0 U	10 0 U
Di n octylphthalate	1/3	2 00 J	2 00 J	C2 SW 02	10 0 U	10 0 U
Benzo(b)fluoranthene	1/3	0 80 J	0 80 J	C2 SW 01	10 0 U	10 0 U
PESTICIDES/PCBs						
Heptachlor Epoxide	1/3	0 01 J	0 01 J	C2 SW 01	0 05 U	0 06 U
4,4'-DDE	1/3	0 004 J	0 004 J	C2 SW 02	0 10 U	0 11 U
4,4' DDT	1/3	0 01 J	0 01 J	C2 SW 02	0 10 U	0 11 U
gamma Chlordane	1/3	0 02 JN	0 02 JN	C2 SW 01	0 05 U	0 06 U
INORGANICS						
Aluminum	3/3	636	12,500	C2 SW 02	-	-
Arsenic	2/3	2 90 B	4 10 B	C2 SW 02	1 90 U	1 90 U
Barium	3/3	46 2 B	236	C2 SW 02	-	-
Beryllium	2/3	0 59 B	0 80 B	C2 SW 02	0 30 U	0 30 U
Calcium	3/3	16,900	27,200	C2 SW 02	-	-
Chromium	1/3	19 3	19 3	C2 SW 02	2 60 UJ	2 70 UJ
Cobalt	2/3	2 70 B	8 20 B	C2 SW 02	1 30 U	1 30 U
Copper	3/3	7 50 B	118	C2 SW 02	-	-
Iron	3/3	2,020 J	14,000	C2 SW 02	-	-
Lead	3/3	8 30	74 0	C2 SW 02	-	-
Magnesium	3/3	4,240 B	9,570	C2 SW 02	-	-
Manganese	3/3	208	911	C2 SW 02	-	-
Mercury	1/3	0 13 B	0 13 B	C2 SW 01	0 10 U	0 10 U
Nickel	2/3	5 90 B	20 7 B	C2 SW 02	2 60 U	2 60 U
Potassium	3/3	530	4,790 B	C1 SW 02	-	-
Sodium	3/3	5,860	40,400	C2 SW 02	-	-
Vanadium	3/3	2 90 B	31 6 B	C2 SW 02	-	-
Zinc	3/3	46 1	326 J	C2 SW 02	-	-

Sample Group.
C1 SW 02, C2 SW 01, C2 SW 02

TABLE 4

SUMMARY OF CHEMICALS IN SEDIMENT

TABLE 4

CHEMSOL, INC SITE
SUMMARY OF CHEMICALS IN SEDIMENT
ON SITE
CONCENTRATION (ug/kg)

	Frequency of Detection	Range of Detected Concentrations Minimum	Range of Detected Concentrations Maximum	Location of Maximum	Range of Non Detect Concentrations Minimum	Range of Non Detect Concentrations Maximum
CHEMICALS						
VOCs						
Methylene Chloride	2/24	27 0 J	27 0 J	C2 SD 10 01	13 0 U	83 5 UJ
Acetone	3/24	270 J	940 D	C1 SD 05 01	15 0 UJ	150 U
Carbon Disulfide	1/24	4 00 J	4 00 J	C1 SD 05 01	13 0 U	83 5 UJ
1,1 Dichloroethane	1/24	32 0 J	32 0 J	C2 SD 06 01	13 0 U	83 5 UJ
1,2 Dichloroethene (Total)	4/24	1 00 J	170 J	C2 SD 08 01	13 0 U	83 5 UJ
Chloroform	1/24	12 0 J	12 0 J	C2 SD 06 01	13 0 U	83 5 U'
2 Butanone	7/24	14 0	150	C1 SD 05 01	15 0 U	52 0 UJ
1,1,1 Trichloroethane	1/24	13 0 J	13 0 J	C2 SD 08 01	13 0 U	83 5 UJ
Trichloroethene	4/24	7 00 J	79 0 J	C2 SD 08 01	13 0 U	83 5 UJ
Benzene	4/24	49 0	220 J	C2 SD 05 02	13 0 U	83 5 UJ
Tetrachloroethene	1/24	0 30 J	0 30 J	C1 SD 07 01	13 0 U	83 5 UJ
Toluene	3/24	0 30 J	3 00 J	C1 SD 05 01	13 0 U	83 5 UJ
Chlorobenzene	4/24	68 0	150	C1 SD 05 01	13 0 U	83 5 UJ
Ethylbenzene	4/24	0 40 J	34 0	C1 SD 05 02	13 0 U	83 5 UJ
Styrene	1/24	0 20 J	0 20 J	C1 SD 05 02	13 0 U	83 5 UJ
Xylenes (Total)	5/24	1 00 J	260	C1 SD 05 02	13 0 U	83 5 UJ
SVOCs						
4 Methylphenol	1/24	180 J	180 J	C1 SD 05 02	510 U	31,000 UJ
Naphthalene	5/24	47 0 J	450 J	C2 SD 05 02	510 U	31,000 UJ
2 Methylnaphthalene	4/24	18 0 J	66 0 J	C2 SD 05 02	510 U	31,000 UJ
Acenaphthylene	5/24	33 0 J	140 J	C1 SD 04 01	510 U	31,000 UJ
Acenaphthene	3/24	12 0 J	350 J	C1 SD 04 01	510 U	31,000 UJ
Dibenzofuran	1/24	210 J	210 J	C1 SD 04 01	510 U	31,000 UJ
Diethylphthalate	2/24	84 0 J	110 J	C2 SD 08 01	510 U	31,000 UJ
Fluorene	4/24	38 0 J	600 J	C1 SD 04 01	510 U	31,000 UJ
Phenanthrene	20/24	20 0 J	8,000 JD	C1 SD 04 01	510 U	31,000 UJ
Anthracene	10/24	26 0 J	1,700 J	C1 SD 04 01	510 U	31,000 UJ
Carbazole	6/24	20 0 J	1,500 J	C1 SD 04 01	510 U	31,000 UJ
Di n butylphthalate	6/24	26 0 J	13,000 JD	C1 SD 04 02	530 U	31,000 UJ
Fluoranthene	21/24	25 0 J	17,000 JD	C1 SD 04 02	760 UJ	31,000 UJ
Pyrene	22/24	36 0 J	24,000 JD	C1 SD 04 01	760 UJ	31,000 UJ

Sample Group.
C1 SD 03 01 AV, C1 SD 03 02, C1 SD 04 01, C1 SD 04 02, C1 SD 05 01, C1 SD 05 02, C1 SD 06 01, C1 SD 06 02, C1 SD 07 01, C1 SD 08 01,
C2 SD 03 01 AV, C2 SD 03 02, C2 SD 04 01, C2 SD 04 02, C2 SD 05 01, C2 SD 05 02, C2 SD 06 01, C2 SD 06 02, C2 SD 10 01, C2 SD 10 02,
C2 SD 11 01, C2 SD 11 02, C2 SD 12 01, C2 SD 12 02

TABLE 4 (cont'd)

CHEMSOL, INC. SITE
SUMMARY OF CHEMICALS IN SEDIMENT

ON SITE

CONCENTRATION (ug/kg)

	Frequency of Detection	Range of Detected Concentrations Minimum	Maximum	Location of Maximum	Range of Non Detect Concentrations Minimum	Maximum
CHEMICALS						
SVOCs (Cont'd)						
Butylbenzylphthalate	8/24	86.0 J	4,000 J	C1-SD-04-01	510 U	31,000 UJ
3,3'-Dichlorobenzidine	1/24	660 J	660 J	C1-SD-05-01	510 U	31,000 UJ
Benzo(a)anthracene	18/24	41.0 J	11,000 JD	C1-SD-04-01	510 U	31,000 UJ
Chrysene	19/24	49.0 J	12,000 JD	C1-SD-04-01	510 U	31,000 UJ
Bis(2-ethylhexyl)phthalate	24/24	150 J	43,000 JD	C1-SD-04-02		
Di-n-octylphthalate	2/23	600	110,000 JD	C1-SD-04-01	510 U	31,000 UJ
Benzo(b)fluoranthene	17/24	170 J	32,000 JD	C1-SD-04-01	510 U	31,000 UJ
Benzo(k)fluoranthene	14/24	99.0 J	7,200 J	C1-SD-04-01	510 U	31,000 UJ
Benzo(a)pyrene	13/24	140 J	13,000 JD	C1-SD-04-01	510 U	31,000 UJ
Indeno(1,2,3-cd)pyrene	4/23	310 J	7,000 J	C1-SD-04-01	510 U	31,000 UJ
Dibenzo(a,h)anthracene	2/23	390 J	1,600 J	C1-SD-04-01	510 U	31,000 UJ
Benzo(g,h,i)perylene	5/23	74.0 J	4,000 J	C1-SD-04-01	510 U	31,000 UJ
PESTICIDES/PCBs						
alpha-BHC	3/20	0.10 J	1.50 J	C2-SD-04-01	2.60 UJ	91.5 UJ
Heptachlor	2/16	8.20 J	31.0 JN	C2-SD-03-01-AV	2.60 UJ	39.0 UJ
Endosulfan I	2/13	0.22 J	0.23 J	C2-SD-12-01	3.90 UJ	91.5 UJ
4,4'-DDE	12/23	5.00 JN	290 JD	C2-SD-11-02	7.50 UJ	175 UJ
Endrin (Total)	1/23	10.0 JN	10.0 JN	C2-SD-10-01	5.10 UJ	175 UJ
Endosulfan II	4/24	17.0 J	120 J	C2-SD-04-02	5.10 UJ	175 UJ
Endosulfan Sulfate	2/22	0.27 J	0.33 J	C2-SD-12-02	5.10 UJ	175 UJ
4,4'-DDT	2/13	11.0	99.0 J	C2-SD-06-01	7.50 UJ	175 UJ
Endrin Aldehyde	4/20	7.20 JN	27.0 JN	C2-SD-11-01	5.10 UJ	175 UJ
Aroclor 1248	5/24	390 J	6,300 JND	C2-SD-04-02	51.0 UJ	1,750 UJ
Aroclor 1254	14/24	38.0 J	10,000 JN	C1-SD-07-01	58.0 U	760 UJ
Aroclor 1260	10/24	130 J	3,800 D	C2-SD-04-02	51.0 UJ	1,750 UJ

Sample Group:
C1-SD-03-01-AV, C1-SD-03-02, C1-SD-04-01, C1-SD-04-02, C1-SD-05-01, C1-SD-05-02, C1-SD-06-01, C1-SD-06-02, C1-SD-07-01, C1-SD-08-01,
C2-SD-03-01-AV, C2-SD-03-02, C2-SD-04-01, C2-SD-04-02, C2-SD-05-01, C2-SD-05-02, C2-SD-06-01, C2-SD-06-02, C2-SD-10-01, C2-SD-10-02,
C2-SD-11-01, C2-SD-11-02, C2-SD-12-01, C2-SD-12-02

TABLE 4 (cont'd)

CHEMSOL, INC SITE
SUMMARY OF CHEMICALS IN SEDIMENT

ON SITE

CONCENTRATION (mg/kg)

	Frequency of Detection	Range of Detected Concentrations Minimum	Range of Detected Concentrations Maximum	Location of Maximum	Range of Non Detect Concentrations Minimum	Range of Non Detect Concentrations Maximum
CHEMICALS						
INORGANICS						
Aluminum	24/24	6,150	34,200	C1 SD 07 01	-	-
Arsenic	24/24	1.80 BJ	31.7 J	C2 SD 10 01	-	-
Barium	24/24	119	447 J	C2 SD 10 02	-	-
Beryllium	24/24	0.35 B	3.10 BJ	C2 SD 03 01 AV	-	-
Cadmium	17/24	0.52 B	8.90 J	C1 SD 03 02	0.29 U	0.52 UJ
Calcium	24/24	958 B	7,410 J	C1 SD 03 01 AV	-	-
Chromium	24/24	11.2	198	C2 SD 11 02	-	-
Cobalt	24/24	4.10 B	41.8 J	C2 SD 10 01	-	-
Copper	24/24	12.7	171 J	C2 SD 03 01 AV	-	-
Iron	24/24	10,200	66,700	C1 SD 07 01	-	-
Lead	24/24	29.4	405	C1 SD 07 01	-	-
Magnesium	24/24	1,630	6,200	C1 SD 07 01	-	-
Manganese	24/24	158	4,170 J	C2 SD 10 02	-	-
Mercury	24/24	0.11 B	7.10 J	C2 SD 11 02	0.08 UJ	1.00 U
Nickel	24/24	9.60 B	63.9 J	C1 SD 03 02	-	-
Potassium	24/24	554 BJ	1,740 BJ	C2 SD 12 01	-	-
Selenium	6/23	1.40 BJ	4.55 BJ	C1 SD 03 01 AV	1.20 U	3.90 UJ
Silver	15/24	1.40 B	7.60 J	C2 SD 04 02	0.77 U	4.70 UBJ
Sodium	24/24	97.8 B	364 BJ	C2 SD 03 01 AV	-	-
Vanadium	24/24	19.5	201 J	C1 SD 07 01	-	-
Zinc	24/24	35.9 J	461 J	C1 SD 03 01 AV	-	-

Sample Group.
C1 SD 03 01 AV, C1 SD 03 02, C1 SD 04 01, C1 SD 04 02, C1 SD 05 01, C1 SD 05 02, C1 SD 06 01, C1 SD 06 02, C1 SD 07 01, C1 SD 08 01, C2 SD 03 01 AV, C2 SD 03 02, C2 SD 04 01, C2 SD 04 02, C2 SD 05 01, C2 SD 05 02, C2 SD 06 01, C2 SD 06 02, C2 SD 10 01, C2 SD 10 02, C2 SD 11 01, C2 SD 11 02, C2 SD 12 01, C2 SD 12 02

TABLE 4 (cont'd)

CHEMSOL, INC SITE
SUMMARY OF CHEMICALS IN SEDIMENT

UPSTREAM (OF THE SITE)

CONCENTRATION (ug/kg)

	Frequency of Detection	Range of Detected Concentrations Minimum	Range of Detected Concentrations Maximum	Location of Maximum	Range of Non Detect Concentrations Minimum	Range of Non Detect Concentrations Maximum
CHEMICALS						
VOCs						
Vinyl Chloride	1/8	4 00 J	4 00 J	C1 SD 02 02	12 0 U	30 0 UJ
1,2 Dichloroethene (Total)	3/8	3 00 J	15 0 J	C1 SD 02 02	12 0 U	30 0 UJ
1,2 Dichloroethane	1/8	0 60 J	0 60 J	C1 SD 02 02	12 0 U	30 0 UJ
Trichloroethene	2/8	1 00 J	4 00 J	C1 SD 02 02	12 0 U	30 0 UJ
Tetrachloroethene	1/8	3 00 J	3 00 J	C1 SD 02 02	12 0 U	30 0 UJ
Toluene	1/8	15 0 J	15 0 J	C2 SD 02 01	12 0 U	30 0 UJ
SVOCs						
4 Methylphenol	1/8	86 0 J	86 0 J	C2 SD 02 01	410 U	1,000 UJ
Naphthalene	2/8	30 0 J	40 0 J	C2 SD 02 02	410 U	1,000 UJ
2 Methylnaphthalene	2/8	33 0 J	57 0 J	C2 SD 02 02	410 U	1,000 UJ
Acenaphthylene	1/8	43 0 J	43 0 J	C1 SD 01 01	410 U	1,000 UJ
Acenaphthene	2/8	97 0 J	120 J	C1 SD 01 01	410 U	920 UJ
Dibenzofuran	1/8	61 0 J	61 0 J	C1 SD 01 01	410 U	920 UJ
Diethylphthalate	1/8	190 J	190 J	C2 SD 02 01	410 U	1,000 UJ
Fluorene	2/8	120 J	140 J	C1 SD 01 01	410 U	920 UJ
Phenanthrene	8/8	49 0 J	2,900 J	C1 SD 01 01	-	-
Anthracene	6/8	28 0 J	430 J	C1 SD 01 01	420 U	460 U
Carbazole	6/8	24 0 J	390 J	C1 SD 01 01	420 U	460 U
Di n butylphthalate	1/8	92 0 J	92 0 J	C1 SD 01 01	410 U	920 UJ
Fluoranthene	8/8	91 0 J	9,600 JD	C1 SD 01 01	-	-
Pyrene	8/8	56 0 J	7,900 JD	C1 SD 01 01	-	-
Butylbenzylphthalate	5/8	89 0 J	1,100 J	C1 SD 01 01	420 U	1,000 U
Benzo(a)anthracene	6/8	220 J	4,700 J	C1 SD 01 01	420 U	460 U
Chrysene	6/8	320 J	5,400 J	C1 SD 01 01	420 U	460 U
Bis(2 ethylhexyl)phthalate	8/8	550	4,400 JD	C1 SD 01 01	-	-
Benzo(b)fluoranthene	8/8	70 0 J	9,700 JD	C1 SD 01 01	-	-
Benzo(k)fluoranthene	4/5	21 0 J	4,000 J	C1 SD 01 01	1,000 UJ	1,000 UJ
Benzo(a)pyrene	7/8	31 0 J	5,100 J	C1 SD 01 01	460 U	460 U
Indeno(1,2,3 cd)pyrene	4/6	130 J	3,000 J	C1 SD 01 01	420 U	460 U
Dibenzo(a,h)anthracene	1/5	560 J	560 J	C1 SD 01 01	410 UJ	1,000 UJ
Benzo(g,h,i)perylene	3/5	86 0 J	2,200 J	C1 SD 01 01	420 U	460 U
Pesticides/PCBs						
Heptachlor	1/5	2 20 J	2 20 J	C1 SD 01 02	2 20 U	4 70 UJ
Heptachlor Epoxide	2/8	8 40 J	28 0 JN	C2 SD 01 01	2 20 U	11 0 U

Sample Group.
C1 SD 01 01, C1 SD 01 02, C1 SD 02 01, C1 SD 02 02, C2 SD 01 01, C2 SD 01 02, C2 SD 02 01, C2 SD 02 02

TABLE 4 (cont'd)

CHEMSOL, INC. SITE
SUMMARY OF CHEMICALS IN SEDIMENT

UPSTREAM (OF THE SITE)

CONCENTRATION (ug/kg)

CHEMICALS	Frequency of Detection	Range of Detected Concentrations Minimum	Maximum	Location of Maximum	Range of Non-Detect Concentrations Minimum	Maximum
Pesticides/PCBs (Cont'd)						
Endosulfan I	1/8	230 DJ	230 DJ	C2-SD-01-01	2.20 U	11.0 U
Dieldrin	1/5	3.60 JN	3.60 JN	C2-SD-02-01	4.20 UJ	21.0 UJ
4,4'-DDE	3/7	2.80 J	42.0 JN	C2-SD-01-01	4.20 U	21.0 U
Endrin, Total	1/8	1.80 J	1.80 J	C2-SD-02-02	4.20 U	21.0 U
Endosulfan II	3/8	0.80 J	2.30 JN	C2-SD-02-02	4.60 U	21.0 U
4,4'-DDD	1/7	2.70 J	2.70 J	C2-SD-02-02	4.20 U	21.0 U
Endrin Aldehyde	1/3	13.0	13.0	C1-SD-02-01	7.70 UJ	21.0 U
Alpha Chlordane	2/4	75.0 JN	130 JN	C1-SD-01-02	2.20 U	2.40 U
Gamma Chlordane	5/7	3.70 J	200 DJ	C2-SD-01-01	2.20 U	2.40 U
Aroclor 1254	4/7	50.0 JN	370 J	C1-SD-01-01	42.0 U	100 UJ
INORGANICS (mg/kg)						
Aluminum	8/8	7,660	20,600	C2-SD-02-01	-	-
Arsenic	8/8	1.00 B	10.7 J	C2-SD-02-01	-	-
Barium	8/8	99.9 J	208	C2-SD-02-01	-	-
Beryllium	6/8	0.57 BJ	1.40 BJ	C1-SD-01-01	0.32 U	0.53 UJ
Cadmium	1/8	2.10 BJ	2.10 BJ	C2-SD-01-01	0.25 U	0.52 UJ
Calcium	8/8	1,480	5,490 J	C2-SD-01-01	-	-
Chromium	8/8	13.8 J	29.4 J	C1-SD-01-01	-	-
Cobalt	8/8	6.80 B	12.5 B	C2-SD-02-01	-	-
Copper	8/8	19.0	324	C1-SD-02-02	-	-
Iron	8/8	13,400	43,800	C2-SD-02-01	-	-
Lead	8/8	49.0	214 J	C1-SD-01-01	-	-
Magnesium	8/8	3,360	6,050 J	C1-SD-01-01	-	-
Manganese	8/8	140 J	1,350	C2-SD-02-01	-	-
Mercury	8/8	0.07 B	0.33 J	C1-SD-01-01	-	-
Nickel	8/8	17.5	40.4 J	C1-SD-01-01	-	-
Potassium	8/8	1,000 B	1,820	C2-SD-02-01	-	-
Selenium	1/8	1.80 BJ	1.80 BJ	C1-SD-01-01	0.97 U	1.90 UJ
Silver	3/8	0.79 B	2.90 BJ	C1-SD-01-01	0.63 U	2.70 UJ
Sodium	8/8	115 B	392 BJ	C2-SD-01-01	-	-
Vanadium	8/8	26.1 J	70.4	C2-SD-02-01	-	-
Zinc	8/8	72.8 J	235 J	C2-SD-01-01	-	-

Sample Group:
C1-SD-01-01, C1-SD-01-02, C1-SD-02-01, C1-SD-02-02, C2-SD-01-01, C2-SD-01-02, C2-SD-02-01, C2-SD-02-02

TABLE 5

CHEMICALS OF POTENTIAL CONCERN

TABLE 5

CHEMSOL, INC SITE
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN IN SITE MATRICES BY AREA OF CONCERN

SURFACE SOIL			SUBSURFACE SOIL	SOILS	AIR		GROUND WATER	SURFACE WATER	SEDIMENT
LOT 1A	LOT 1B	LOT 1A AND LOT 1B (SITE-WIDE)	LOT 1A AND LOT 1B (SITE-WIDE)	EFFLUENT DISCHARGE LINE LOT 1A	ON-SITE	DOWNWIND	SITE-WIDE	ON-SITE	ON-SITE
VOCs:	***VOCs:***	***VOCs:***	***VOCs:***	***VOCs:***	***VOCs:***	***VOCs:***	***VOCs:***	***VOCs:***	***VOCs:***
None Selected	None Selected	None Selected	1,1,2,2-Tetrachloroethane	None Selected	Benzene Dichlorodifluoromethane Hexane Methylene Chloride Tetrachloroethene Toluene Trichloroethene 1,1,2-Trichloro-1,2,2-trifluoroethane	2 Butanone Dichlorodifluoromethane		1,2 Dichloroethane 1,2 Dichloroethene (Total) Vinyl Chloride	None Selected
SVOCs:	***SVOCs:***	***SVOCs:***	***SVOCs:***	***SVOCs:***	***SVOCs:***	***SVOCs:***	***SVOCs:***	***SVOCs:***	***SVOCs:***
None Selected	None Selected	None Selected	None Selected	Benzo(a)pyrene	Not Analyzed	Not Analyzed		Benzo(b)fluoranthene	Benzo(a)anthracene Benzo(b)fluoranthene Benzo(a)pyrene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene
Pesticides/PCBs:	***Pesticides/PCBs:***	***Pesticides/PCBs:***	***Pesticides/PCBs:***	***Pesticides/PCBs:***	***Pesticides/PCBs:***	***Pesticides/PCBs:***	***Pesticides/PCBs:***	***Pesticides/PCBs:***	***Pesticides/PCBs:***
Aroclor 1254	Aldrin Dieldrin Aroclor 1248 Aroclor 1254 Aroclor 1260	Aldrin Dieldrin Aroclor 1248 Aroclor 1254 Aroclor 1260	Aldrin Dieldrin Toxaphene Aroclor 1248 Aroclor 1254 Aroclor 1260	Aroclor 1248 Aroclor 1254 Aroclor 1260	Not Analyzed	Not Analyzed		None Selected	Aroclor 1248 Aroclor 1254 Aroclor 1260
Inorganics:	***Inorganics:***	***Inorganics:***	***Inorganics:***	***Inorganics:***	***Inorganics:***	***Inorganics:***	***Inorganics:***	***Inorganics:***	***Inorganics:***
Arsenic Beryllium Manganese Mercury Silver Vanadium	Antimony Arsenic Cadmium Chromium VI Manganese Mercury Thallium Vanadium	Antimony Arsenic Cadmium Chromium VI Manganese Mercury Thallium Vanadium	Antimony Arsenic Barium Beryllium Chromium VI Manganese Mercury Thallium Vanadium	Arsenic Barium Beryllium Manganese Mercury Thallium Vanadium Zinc	Not Analyzed	Not Analyzed		Cadmium Manganese	Arsenic Beryllium Manganese Mercury Vanadium

TABLE 6

POTENTIAL EXPOSURE PATHWAYS

TABLE 6

CHEMSOL, INC SITE
POTENTIAL EXPOSURE PATHWAYS

Matrix	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
PRESENT - USE SCENARIOS:				
Surface Soil				
	Area Residents/Trespassers (Children 12 - 17 Years Old) Lot 1A	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes No	Residents of the apartment complex at the northern edge and along the western boundary of the site may come into direct contact with surface soil in the wooded area of the site (Lot 1A). Since Lot 1A is not fenced, it is easily accessible to trespassers who, based on observations made during site visits, use the area for recreational purposes. Exposure from the inhalation of suspended particulates from surface soil is assumed to be negligible, as the ground is covered with vegetation.
	Area Residents/Trespassers (Children 12 - 17 Years Old) Lot 1B	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes No	Residents of the apartment complex at the northern edge and along the western boundary of the site may come into direct contact with surface soil in Lot 1B, as only a chain link fence surrounds the area. Trespasser exposure to suspended surface soil particulates is assumed to be negligible based on the lower frequency of exposure in this area as compared to Lot 1A and the presence of ground cover.
	Downwind (Off-Site) Residents	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since no construction work (i.e., excavation activity) is currently in progress at at the site, exposure from particulate releases into the ambient air and transport downwind is assumed to be negligible.
	Site Workers (Site-Wide) (Lot 1A and Lot 1B)	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since the facility is no longer operational, no site worker (employee) exposure is occurring.
	Construction Workers (Site-Wide) (Lot 1A and Lot 1B)	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since no construction work (i.e., excavation activity) is currently in progress in Lot 1A or Lot 1B, construction workers are not assumed to be exposed to site surface soil.

TABLE 6 (cont'd)

CHEMSOL, INC SITE
POTENTIAL EXPOSURE PATHWAYS

Matrix	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
PRESENT - USE SCENARIOS CONT'D:				
Subsurface Soil				
	Area Residents/Trespassers (Children 12 - 17 Years Old) Lot 1A	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since no construction work (i.e., excavation activity) is currently in progress in the southeastern portion of Lot 1A, trespasser exposure to subsurface soil is assumed to be negligible.
	Area Residents/Trespassers (Children 12 - 17 Years Old) Lot 1B	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since no construction work (i.e., excavation activity) is currently in progress is currently in progress in Lot 1B, trespasser exposure to subsurface soil is assumed to be negligible.
	Downwind (Off-Site) Residents	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since no construction work (i.e., excavation activity) is currently in progress in Lot 1B, exposure from particulate releases into the ambient air and transport downwind is assumed to be negligible.
	Site Workers (Site-Wide) (Lot 1A and Lot 1B)	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since the facility is no longer operational, no site worker (employee) exposure is assumed to occur.
	Construction Workers (Site-Wide) (Lot 1A and Lot 1B)	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since no construction work (i.e., excavation activity) is currently in progress in Lot 1A or Lot 1B, no construction worker exposure to subsurface soil is assumed to occur.
Surface/Subsurface Soil				
	Area Residents/Trespassers (Children 12-17 Years Old) Effluent Discharge Line	Ingestion Dermal Contact Inhalation of Particulates	Yes Yes No	Area residents (i.e., apartment complex and Fleming Street) may come into direct contact with soil covering the effluent discharge line. However, the frequency of exposure would likely be low due to the distance of this portion of the site from the residential areas. Exposure from the inhalation of suspended soil particulates is assumed to be negligible, as the ground is covered with vegetation.
	Site Workers Effluent Discharge Line	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since the facility is no longer operational, no site worker (employee) exposure is assumed to occur.
	Construction Workers Effluent Discharge Line	Ingestion Dermal Contact Inhalation of Particulates	No No No	Since no construction work (i.e., excavation activity) is currently in progress in Lot 1A or Lot 1B, no construction worker exposure to soils is assumed to occur.

TABLE 6 (cont'd)

CHEMSOL, INC SITE
POTENTIAL EXPOSURE PATHWAYS

Matrix	Receptor Population(s)	Exposure Route s)	Retained for Quantitative Analysis	Justification
PRESENT - USE SCENARIOS CONT'D:				
Air				
	Downwind (Off-Site) Residents (Adults and Children)	Inhalation of VOCs	Yes	Residents living downwind of the site may be exposed to VOCs released released into the ambient air and transported downwind. into the ambient air and transported off-site (downwind).
	Site Workers (Site-Wide)	Inhalation of VOCs	No	Since the f[illegible]ility is no longer operational, no site worker (employee) exposure to VOCs in air is occurring.
	Construction Workers (Site-Wide)	Inhalation of VOCs	No	Since no construction work (i.e., excavation activity) is currently in progress in Lot 1A or Lot 1B, no construction worker exposure to VOCs released into the air is assumed to occur.
Ground Water	Residents (Adults and Children) Site Vicinity	Ingestion Dermal Contact (Shower) Inhalation of VOCs	No No** No	No residents currently live on-site. Therefore, no residential exposure to on-site ground water is occurring. All water connections on-site are to a public water supply.
	Site Workers (Site-Wide)	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower)	No No No	Since the facility does not use on-site ground water for potable purposes and the facility is no longer operational, no site worker (employee) exposure is occurring. All water connections on-site are to a public water supply.
	Construction Workers (Site-Wide)	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower)	No No No	Since no construction work (i.e., excavation activity) is currently in progress at the site, no construction worker exposure to ground water is occurring. All water connections on-site are to a public water supply.
Surface Water (Stream 1B and Drainage Ditch)	Area Residents/Trespassers (Children 12 - 17 Years)	Ingestion Dermal Contact Inhalation of VOCs	No Yes No	Trespassers may dermally contact surface water in the stream and ditch while on-site. However, they are not assumed to ingest surface water since the stream and ditch are too shallow to support formal recreational activities (i.e., wading, swimming). Since limited contact with surface water is likely to occur, exposure from releases into the ambient air is assumed to be negligible.
Sediment (Stream 1B and Drainage Ditch)	Area Residents/Trespassers (Children 12 - 17 Years)	Ingestion Dermal Contact Inhalation of Particulates	No Yes No	Trespassers may dermally contact sediments in the stream and ditch while on-site. However, they are not assumed to ingest sediment since the stream and ditch are too shallow to support formal recreational activities (i.e., wading, swimming). Since the stream and ditch have not been observed to dry out for several years, it is assumed that the amount of suspended sediment particulates is negligible.

TABLE 6 (cont'd)

CHEMSOL, INC SITE
POTENTIAL EXPOSURE PATHWAYS

Matrix	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
FUTURE - USE SCENARIOS:				
Surface Soil				
	Residents (Adults and Children) Lot 1A	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes Yes	If the site is residentially developed in the future, residents may come into direct contact with surface soil in the vicinity of their homes.
	Residents (Adults and Children) Lot 1B	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes Yes	If the site is residentially developed in the future, residents may come into direct contact with surface soil in the vicinity of their homes.
	Site Workers (Site-Wide) (Lot 1A and Lot 1B)	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes Yes	If the site is developed for commercial or industrial purposes in the future, site workers may come into direct contact with surface soil during the course of a normal work day (i.e., outdoor work, lunch hour).
	Construction Workers (Site-Wide) (Lot 1A and Lot 1B)	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes Yes	If the site is developed for commercial or industrial purposes in the future, construction workers may come into direct contact with surface soil during the course of a normal work day (i.e., outdoor work, excavation).
Subsurface Soil				
	Residents (Adults and Children) Lot 1A	Ingestion Dermal Contact Inhalation of Particulates	No No No	During potential future construction work (i.e., excavation activity), residents are assumed to come into direct contact with a negligible amount of subsurface soil as compared to construction workers.
	Residents (Adults and Children) Lot 1B	Ingestion Dermal Contact Inhalation of Particulates	No No No	During potential future construction work (i.e., excavation activity), residents are assumed to come into direct contact with a negligible amount of subsurface soil as compared to constructions workers.
	Site Workers (Site-Wide) (Lot 1A and Lot 1B)	Ingestion Dermal Contact Inhalation of Particulates	No No No	During potential future construction work (i.e., excavation activity), site workers, during the course of a normal work day, are assumed to come into direct contact with a negligible amount of subsurface soil as compared to construction workers.
	Construction Workers (Site-Wide) (Lot 1A and Lot 1B)	Ingestion Dermal Contact* Inhalation of Particulates Inhalation of VOCs	Yes Yes Yes Yes	During potential future construction work (i.e., excavation activity), construction workers may come into direct contact with exposed subsurface soil and may inhale VOCs released from the soil as a result of mechanical disturbances.

TABLE 6 (cont'd)

CHEMSOL, INC SITE
POTENTIAL EXPOSURE PATHWAYS

Matrix	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
FUTURE - USE SCENARIOS CONT'D:				
Surface/Subsurface Soil	Residents (Adults and Children) Effluent Discharge Line	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes Yes	If the site is residentially developed in the future, residents may come into direct contact with surface soil in the vicinity of their homes.
	Site Workers Effluent Discharge Line	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes Yes	If the site is developed for commercial or industrial purposes in the future, site workers may come into direct contact with soil during the course of a normal work day (i.e., outdoor work, lunch hour.)
	Construction Workers Effluent Discharge Line	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes Yes	If the site is developed for commercial or industrial purposes in the future, construction workers may come into direct contact with soil during the course of a normal work day (i.e., outdoor work, excavation).
Air	Residents (Adults and Children) (Site-Wide)	Inhalation of VOCs	Yes	If the site is residentially developed in the future, residents may be exposed to VOCs released into the ambient air. The inhalation of VOCs route of exposure is also of concern due to the history and extent of chemical contamination at the site.
	Site Workers (Site-Wide)	Inhalation of VOCs	Yes	If the site is developed for commercial or industrial purposes in the future, site workers, during the course of a normal work day, may be exposed to VOCs released into the ambient air. The inhalation of VOCs route of exposure is also of concern due to the history and extent of chemcial contamination at the site.
	Construction Workers (Site-Wide)	Inhalation of VOCs	Yes	If construction work is performed at the site in the future (i.e., commercial or industrial development), construction workers may be exposed to VOCs released into the ambient air. The inhalation of VOCs route of exposure is also of concern due to the history and extent of chemical contamination at the site.
Ground Water	Site Residents (Adults and Children) (Site-Wide)	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower) (Adults only)	Yes No** Yes	The potential exists, if the site is residentially developed in the future, for site residents to obtain their potable water from wells installed into the aquifer beneath the site.
	Site Workers (Site-Wide)	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower)	Yes No No	The potential exists, in the future, for wells to be installed into the aquifer beneath the site. Potential future site workers may ingest ground water from the site; however, they are not assumed to shower on-site.
	Construction Workers (Site-Wide)	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower)	Yes No No	The potential exists, in the future, for wells to be installed into the aquifer beneath the site. Potential future construction workers may ingest ground water from the site; however, they are not assumed to shower on site.

TABLE 6 (cont'd)

CHEMSOL, INC SITE
POTENTIAL EXPOSURE PATHWAYS

Matrix	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
Surface Water (Stream 1B and Drainage Ditch)	Residents (Children)	Ingestion Dermal Contact Inhalation of VOCs	No Yes No	If the site is residentially developed in the future, residents may dermally contact surface water in the vicinity of their homes Since surface water in the stream and ditch is too shallow to support formal recreational activities (i e , wading, swimming), residents are not assumed to ingest the surface water. As limited contact with surface water is likely to occur, inhalation exposure from VOC releases into the ambient air is assumed to be negligible.
Sediment (Stream 1B and Drainage Ditch)	Residents (Children)	Ingestion Dermal Contact Inhalation of Particulates	No Yes No	If the site is residentially developed in the future, residents may dermally contact stream and ditch sediments in the vicinity of their homes. Since surface water in the stream and ditch is too shallow to support formal recreational activities (i e , wading, swimming), residents are not assumed to ingest sediment. As the stream and ditch have not been observed to dry out for several years, it is assumed that the amount of suspended particulates is negligible.

* The dermal contact pathway can only be quantitatively evaluated for PCBs and cadmium as only these chemicals have established dermal absorption factors (PCBs = 6% and cadmium = 1%) All other chemicals will be qualitatively discussed

** The dermal contact with ground water while showering scenario is qualitatively addressed in the risk assessment.

TABLE 7

CARCINOGENIC TOXICITY VALUES

TABLE 7

CHEMSOL, INC. SITE
TOXICITY VALUES FOR POTENTIAL CARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

CHEMICALS	CARCINOGENS: SLOPE FACTORS (SF)		
	Oral SF (mg/kg-day)-1	Inhalation SF (mg/kg-day)-1	Weight - of - Evidence
Volatile Organics			
Acetaldehyde (TIC)	.	7.7E-03	B2
Acetone	.	.	D
Acrolein	.	.	C
Benzene	2.9E-02	2.9E-02	A
Bromodichloromethane	6.2E-02	.	B2
2-Butanone	.	.	D
Carbon Disulfide	.	.	.
Carbon Tetrachloride	1.3E-01	5.3E-02	B2
Chlorobenzene	.	.	D
Chloroethane	.	.	.
Chloroform	6.1E-03	8.1E-02	B2
Dibromochloromethane	8.4E-02	.	C
Dichlorodifluoromethane (TCL and TIC)	.	.	.
1,1-Dichloroethane	.	.	C
1,1-Dichloroethene	6.0E-01	1.8E-01	C
1,2-Dichloroethane	9.1E-02	9.1E-02	B2
1,2-Dichloroethene (Total)	.	.	.
1,2-Dichloropropane	6.8E-02 (2)	.	B2
Ethylbenzene	.	.	D
Hexachlorobutadiene	7.8E-02	7.7E-02	C
Hexachloroethane (TIC)	1.4E-02	1.4E-02	C
Hexane (TCL and TIC)	.	.	.
2-Hexanone	.	.	.
4-Methyl-2-Pentanone	.	.	.
Methanol	.	.	.
Methylene Chloride	7.5E-03	1.6E-03	B2
Styrene	- (3)	- (3)	.
1,1,2,2-Tetrachloroethane	2.0E-01	2.0E-01	C
Tetrachloroethene	5.2E-02 (3)	2.0E-03 (3)	B2-C
Toluene (TCL and TIC)	.	.	D
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.
1,1,1-Trichloroethane	.	.	D
1,1,2-Trichloroethane	5.7E-02	5.6E-02	C
Trichloroethene	1.1E-02 (3)	6.0E-03 (3)	B2-C
Trichlorofluoromethane	.	.	.
1,2,4-Trimethylbenzene	.	.	.
Vinyl Chloride	1.9E+00	3.0E-01	A
Xylenes (Total)	.	.	D

TABLE 7 (cont'd)

CHEMSOL, INC. SITE
TOXICITY VALUES FOR POTENTIAL CARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

CHEMICALS	CARCINOGENS: SLOPE FACTORS (SF)		
	Oral SF (mg/kg-day)-1	Inhalation SF (mg/kg-day)-1	Weight - of - Evidence
Semivolatile Organics			
Acenaphthene	-	-	-
Acenaphthylene	-	-	D
Acetophenone (TIC)	-	-	D
Anthracene	-	-	D
Benzaldehyde (TIC)	-	-	-
Benzoic Acid (TIC)	-	-	D
Benzo(a)anthracene	7.3E-01*	-	B2
Benzo(a)pyrene	7.3E+00*	-	B2
Benzo(b)fluoranthene	7.3E-01*	-	B2
Benzo(g,h,i)perylene	-	-	D
Benzo(k)fluoranthene	7.3E-02*	-	B2
1,1'-Biphenyl (TIC)	-	-	D
Bis(2-chloroethyl)ether	1.1E+00	1.1E+00 (2)	B2
Bis(2-chloroisopropyl)ether	7.0E-02 (2)	3.5E-02 (2)	C
Bis(2-ethylhexyl)phthalate	1.4E-02	-	B2
Butylbenzylphthalate	-	-	C
Carbazole	2.0E-02 (2)	-	B2
Chlorobenzene (TIC)	-	-	D
2-Chlorophenol	-	-	-
Chrysene	7.3E-03*	-	B2
Di-n-butylphthalate	-	-	D
Di-n-octylphthalate	-	-	-
Dibenzo(a,h)anthracene	7.3E+00*	-	B2
Dibenzofuran	-	-	D
1,2-Dichlorobenzene	-	-	D
1,3-Dichlorobenzene	-	-	D
1,4-Dichlorobenzene	2.4E-02 (2)	-	B2
3,3'-Dichlorobenzidine	4.5E-01	-	B2
2,4-Dichlorophenol	-	-	-
Diethylphthalate	-	-	D
2,4-Dimethylphenol	-	-	-
Dimethylphthalate	-	-	D
Ethylbenzene (TIC)	-	-	D
Fluoranthene	-	-	D
Fluorene	-	-	D
Hexachloroethane	1.4E-02	1.4E-02	C
Indeno(1,2,3-cd)pyrene	7.3E-01*	-	B2
Isophorone	9.5E-04	-	C
1-Methylethylbenzene (TIC)	-	-	-
2-Methylnaphthalene	-	-	-
2-Methylphenol	-	-	C
4-Methylphenol	-	-	C
N,N-Dimethylformamide (TIC)	-	-	-

TABLE 7 (cont'd)

CHEMSOL, INC. SITE
TOXICITY VALUES FOR POTENTIAL CARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

CHEMICALS	CARCINOGENS: SLOPE FACTORS (SF)		
	Oral SF (mg/kg-day)-1	Inhalation SF (mg/kg-day)-1	Weight - of - Evidence
Semivolatile Organics (Cont'd)			
N Nitrosodiphenylamine	4.9E-03	-	B2
Naphthalene	-	-	D
Nitrobenzene	-	-	D
Phenanthrene	-	-	D
Phenol	-	-	D
1-Phenylethanone (TIC)	-	-	D
1,2-Propanediol (TIC)	-	-	-
Pyrene	-	-	D
1,2,4-Trichlorobenzene	-	-	D
1,2,3-Trichloropropane (TIC)	7.0E+00 (2)	-	B2
Pesticides/PCBs			
Aldrin	1.7E+01	1.7E+01	B2
Chlordane	1.3E+00 (4)	1.3E+00 (4)	B2
4,4'-DDD	2.4E-01	-	B2
4,4'-DDE	3.4E-01	-	B2
4,4'-DDT	3.4E-01	3.4E-01	B2
alpha-BHC	6.3E+00	6.3E+00	B2
beta-BHC	1.8E+00	1.9E+00	C
delta-BHC	-	-	D
gamma-BHC (Lindane, Total)	1.3E+00 (2)	-	B2-C
Dieldrin	1.6E+01	1.6E+01	B2
Endosulfan	-	-	-
Endosulfan Sulfate	-	-	-
Endrin (Total)	-	-	D
Endrin Aldehyde	-	-	-
Endrin Ketone	-	-	-
Heptachlor	4.5E+00	4.6E+00	B2
Heptachlor Epoxide	9.1E+00	9.1E+00	B2
Methoxychlor	-	-	D
Toxaphene	1.1E+00	1.1E+00	B2
PCBs (Aroclors)	7.7E+00	-	B2
Inorganics			
Aluminum	-	-	-
Antimony	-	-	-
Arsenic	1.75E+00	1.5E+01	A
Barium	-	-	-
Beryllium	4.3E+00	8.4E+00	B2
Cadmium	-	6.3E+00	B1
Chromium III	-	-	-
Chromium VI	-	4.2E+01	A

TABLE 7 (cont'd)

CHEMSOL, INC. SITE
TOXICITY VALUES FOR POTENTIAL CARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

CHEMICALS	CARCINOGENS: SLOPE FACTORS (SF)		
	Oral SF (mg/kg day)-1	Inhalation SF (mg/kg-day)-1	Weight - of - Evidence
Cobalt	-	-	-
Copper**	-	-	-
Cyanide	-	-	D
Lead (and compounds-inorg.)	-	-	B2
Manganese (food)	-	-	D
Manganese(water)	-	-	D
Mercury	-	-	D
Nickel (sol. salt)	-	-	-
Selenium	-	-	D
Silver	-	-	D
Thallium (chloride)	-	-	D
Vanadium	-	-	-
Zinc (and compounds)	-	-	D

NOTES

- Aluminum, calcium, iron, magnesium, potassium and sodium are considered essential nutrients and will not be quantitatively evaluated in the risk assessment.
*Relative potency values were used in conjunction with slope factors per USEPA Guidance (July, 1993)
**The current drinking water standard for copper is 1.3 mg/l. The DWCD (1987) concluded that toxicity data are inadequate for calculation of a reference dose for this chemical.
(1) All toxicity values obtained from IRIS (on-line September 21, 22, and 27, 1994, November 9, 10, 21, and 23, 1994, and January 10, 1995) unless otherwise noted.
(2) Toxicity values obtained from HEAST Annual FY-1994.
(3) Toxicity values were verified by the Superfund Health Risk Technical Support Center. October 27, 1994
(4) The carcinogenic toxicity values for chlordane are reported, as the individual alpha and gamma-chlordane isomers do not have established carcinogenic toxicity values.
(5) No carcinogenic toxicity values are currently established for endosulfan or its isomers endosulfan I and endosulfan II.

USEPA WEIGHT - OF - EVIDENCE:

A - Human Carcinogen
B1 - Probable Human Carcinogen. Limited human data are available
B2 - Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals and inadequate or no evidence in humans.
C - Possible Human Carcinogen
D - Not Classifiable as to human carcinogenicity.
E - Evidence of noncarcinogenicity for humans

TABLE 8

HAZARD INDEX

TABLE 8

CHEMSOL, INC. SITE
TOXICITY ENDPOINTS/TARGET ORGANS FOR NONCARCINOGENIC CHEMICALS OF POTENTIAL CONCERN QUANTITATIVELY EVALUATED IN THE RISK ASSESSMENT

CHEMICALS	TOXICITY ENDPOINT/TARGET ORGAN*
Acetaldehyde (TIC)	Respiratory Tract
Acetone	Liver, Kidney
Acrolein	Respiratory Tract
Carbon Tetrachloride	Liver
Chloroform	Liver
1,2-Dichloroethene (Total)	Liver
Trichloroethene	Liver, Kidney
Manganese	Central Nervous System

MATRIX	EXPOSURE ROUTE	RECEPTOR	HAZARD INDEX	HAZARD INDEX BY TOXICITY ENDPOINT/TARGET ORGAN
Surface Soil: (Lot 1A)	Ingestion	Residents: Children	1.5	Manganese - 1.2
	Inhalation of Particulates	Children	0.6	Manganese - 0.6
(Lot 1B)	Ingestion	Residents: Children	6.2	Manganese - 2.6
	Inhalation of Particulates	Children	0.9	Manganese - 0.91
Surface/Subsurface Soil: (Effluent Discharge Line)	Ingestion	Residents: Children	3.7	Manganese - 3.1
	Inhalation of Particulates	Children	1.5	Manganese - 1.5

TABLE 8 (cont'd)

CHEMSOL, INC. SITE
TOXICITY ENDPOINTS/TARGET ORGANS FOR NONCARCINOGENIC CHEMICALS OF POTENTIAL CONCERN
QUANTITATIVELY EVALUATED IN THE RISK ASSESSMENT

MATRIX	EXPOSURE ROUTE	RECEPTOR	HAZARD INDEX	HAZARD INDEX BY TOXICITY ENDPOINT/TARGET ORGAN
Ground Water: (Site-Wide)		Residents:		
	Ingestion	Adults	340	Acetone - 3.0 Carbon Tetrachloride - 130 Chloroform - 35 1,2-Dichloroethene (Total) - 61 Trichloroethene - 70 Manganese - 40
	Ingestion	Children	800	Acetone - 6.9 Carbon Tetrachloride - 310 Chloroform - 82 1,2-Dichloroethene (Total) - 140 Trichloroethene - 160 Manganese - 94
	Ingestion	Site Workers/ Employees	120	Acetone - 1.1 Carbon Tetrachloride - 48 Chloroform - 13 1,2-Dichloroethene (Total) - 22 Trichloroethene - 25 Manganese -14
	Ingestion	Construction Workers	17	Carbon Tetrachloride - 4.4 Chloroform - 3.3 1,2-Dichloroethene (Total) - 5.7 Manganese - 3.7

*Sources: Integrated Risk Information System (IRIS) on-line September and November 1994 and January 1995, HEAST FY 1994 - Annual.

TABLE 9

NONCARCINOGENIC TOXICITY VALUES

2/8/95
TOXNOS 2.wk

TABLE 9

CHEMSOL, INC. SITE
CHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

CHEMICALS	NONCARCINOGENS: REFERENCE DOSES (RfD)			
	Oral RfD (mg/kg-day)	Uncertainty Factor	Inhalation RfD (mg/kg-day)	Uncertainty Factor
Volatile Organics				
Acetaldehyde (TIC)	-	-	2.6E-03	1000
Acetone	1.0E-01	1000	-	-
Acrolein	2.0E-02 (2)	1000	5.7E-06	1000
Benzene	-	-	-	-
Bromodichloromethane	2.0E-02	1000	-	-
2-Butanone	6.0E-01	3000	2.9E-01	1000
Carbon Disulfide	1.0E-01	100	2.9E-03 (2)	1000
Carbon Tetrachloride	7.0E-04	1000	-	-
Chlorobenzene	2.0E-02	1000	5.7E-03 (2)	10000
Chloroethane	-	-	2.9E+00	300
Chloroform	1.0E-02	1000	-	-
Dibromochloromethane	2.0E-02	1000	-	-
Dichlorodifluoromethane (TCL and TIC)	2.0E-01	100	5.0E-02 (2)	10000
1,1-Dichloroethane	1.0E-01 (2)	1000	1.0E-01 (2)	1000
1,1-Dichloroethene	9.0E-03	1000	-	-
1,2-Dichloroethane	-	-	-	-
1,2-Dichloroethene (Total)	9.0E-03 (2)	1000	-	-
1,2-Dichloropropane	-	-	1.1E-03	300
Ethylbenzene	1.0E-01	1000	2.9E-01	300
Hexachlorobutadiene	2.0E-04 (2)	1000	-	-
Hexachloroethane (TIC)	1.0E-03	1000	-	-
Hexane (TCL and TIC)	6.0E-02 (2)	10000	5.7E-02	300
2-Hexanone	-	-	-	-
4-Methyl-2-Pentanone	8.0E-02 (2)	3000	2.0E-02 (2)	1000
Methanol	5.0E-01	1000	-	-
Methylene Chloride	6.0E-02	100	8.6E-01 (2)	100
Styrene	2.0E-01	1000	2.9E-01	30
1,1,2,2-Tetrachloroethane	-	-	-	-
Tetrachloroethene	1.0E-02	1000	-	-
Toluene (TCL and TIC)	2.0E-01	1000	1.1E-01	300
1,1,2-Trichloro-1,2,2-trifluoroethane	3.0E+01	10	8.6E+00 (2)	100
1,1,1-Trichloroethane	-	-	-	-
1,1,2-Trichloroethane	4.0E-03	1000	-	-
Trichloroethene	6.0E-03 (3)	3000	-	-
Trichlorofluoromethane	3.0E-01	1000	2.0E-01 (2)	10000
1,2,4-Trimethylbenzene	-	-	-	-
Vinyl Chloride	-	-	-	-
Xylenes (Total)	2.0E+00	100	-	-

TABLE 9 (cont'd)

CHEMSOL, INC. SITE
CHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

CHEMICALS	NONCARCINOGENS: REFERENCE DOSES (RfD)			
	Oral RfD (mg/kg-day)	Uncertainty Factor	Inhalation RfD (mg/kg-day)	Uncertainty Factor
Semivolatile Organics				
Acenaphthene	6.0E-02	3000	-	-
Acenaphthylene	-	-	-	-
Acetophenone (TIC)	1.0E-01	3000	-	-
Anthracene	3.0E-01	3000	-	-
Benzaldehyde (TIC)	1.0E-01	1000	-	-
Benzoic Acid (TIC)	4.0E+00	1	-	-
Benzo(a)anthracene	-	-	-	-
Benzo(a)pyrene	-	-	-	-
Benzo(b)fluoranthene	-	-	-	-
Benzo(g,h,i)perylene	-	-	-	-
Benzo(k)fluoranthene	-	-	-	-
1,1'-Biphenyl (TIC)	5.0E-02	100	-	-
Bis(2-chloroethyl)ether	-	-	-	-
Bis(2-chloroisopropyl)ether	4.0E-02	1000	-	-
Bis(2-ethylhexyl)phthalate	2.0E-02	1000	-	-
Butylbenzylphthalate	2.0E-01	1000	-	-
Carbazole	-	-	-	-
Chlorobenzene (TIC)	2.0E-02	1000	5.7E-03 (2)	10000
2-Chlorophenol	5.0E-03	1000	-	-
Chrysene	-	-	-	-
Di-n-butylphthalate	1.0E-01	1000	-	-
Di-n-octylphthalate	2.0E-02 (2)	1000	-	-
Dibenzo(a,h)anthracene	-	-	-	-
Dibenzofuran	-	-	-	-
1,2-Dichlorobenzene	9.0E-02	1000	5.7E-02 (2)	1000
1,3-Dichlorobenzene	-	-	-	-
1,4-Dichlorobenzene	-	-	2.3E-01	1000
3,3'-Dichlorobenzidine	-	-	-	-
2,4-Dichlorophenol	3.0E-03	100	-	-
Diethylphthalate	8.0E-01	1000	-	-
2,4-Dimethylphenol	2.0E-02	3000	-	-
Dimethylphthalate	1.0E+01 (2)	100	-	-
Ethylbenzene (TIC)	1.0E-01	1000	2.9E-01	300
Fluoranthene	4.0E-02	3000	-	-
Fluorene	4.0E-02	3000	-	-
Hexachloroethane	1.0E-03	1000	-	-
Indeno(1,2,3-cd)pyrene	-	-	-	-
Isophorone	2.0E-01	1000	-	-
1-Methylethylbenzene (TIC)	4.0E-02	3000	2.6E-03 (2)	10000
2-Methylnaphthalene	-	-	-	-
2-Methylphenol	5.0E-02	1000	-	-
4-Methylphenol	5.0E-03 (2)	1000	-	-
N,N-Dimethylformamide (TIC)	1.0E-01 (2)	1000	8.6E-03	300

TABLE 9 (cont'd)

CHEMSOL, INC. SITE
CHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

CHEMICALS	NONCARCINOGENS: REFERENCE DOSES (RfD)			
	Oral RfD (mg/kg-day)	Uncertainty Factor	Inhalation RfD (mg/kg-day)	Uncertainty Factor
Semivolatile Organics (Cont'd)				
N Nitrosodiphenylamine	-	-	-	-
Naphthalene	4.0E-02 (3)	-	-	-
Nitrobenzene	5.0E-04	10000	6.0E-04 (2)	10000
Phenanthrene	-	-	-	-
Phenol	6.0E-01	100	-	-
1-Phenylethanone (TIC)	1.0E-01	3000	-	-
1,2-Propanediol (TIC)	2.0E+01 (2)	100	-	-
Pyrene	3.0E-02	3000	-	-
1,2,4-Trichlorobenzene	1.0E-02	1000	5.7E-02 (2)	1000
1,2,3-Trichloropropane (TIC)	6.0E-03	1000	-	-
Pesticides/PCBs				
Aldrin	3.0E-05	1000	-	-
Chlordane	6.0E-05 (4)	1000	-	-
4,4'-DDD	-	-	-	-
4,4'-DDE	-	-	-	-
4,4'-DDT	5.0E-04	100	-	-
alpha-BHC	-	-	-	-
beta-BHC	-	-	-	-
delta-BHC	-	-	-	-
gamma-BHC (Lindane, Total)	3.0E-04	1000	-	-
Dieldrin	5.0E-05	100	-	-
Endosulfan	6.0E-03 (2,5)	100	-	-
Endosulfan Sulfate	-	-	-	-
Endrin (Total)	3.0E-04	100	-	-
Endrin Aldehyde	-	-	-	-
Endrin Ketone	-	-	-	-
Heptachlor	5.0E-04	300	-	-
Heptachlor Epoxide	1.3E-05	1000	-	-
Methoxychlor	5.0E-03	1000	-	-
Toxaphene	-	-	-	-
PCBs (Aroclors)	-	-	-	-
Inorganics				
Aluminum	-	-	-	-
Antimony	4.0E-04	1000	-	-
Arsenic	3.0E-04	3	-	-
Barium	7.0E-02	3	-	-
Beryllium	5.0E-03	100	-	-
Cadmium (food)	1.0E-03	10	-	-
Cadmium (water)	5.0E-04	10	-	-
Chromium III	1.0E+00	100	-	-
Chromium VI	5.0E-03	500	-	-

TABLE 9 (cont'd)

CHEMSOL, INC SITE
CHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

CHEMICALS	NONCARCINOGENS: REFERENCE DOSES (RfD)			
	Oral RfD (mg/kg-day)	Uncertainty Factor	Inhalation RfD (mg/kg-day)	Uncertainty Factor
Inorganics (Cont'd)				
Cobalt	-	-	-	-
Copper*	-	-	-	-
Cyanide	2.0E-02	100	-	-
Lead (and compounds-inorg.)	-	-	-	-
Manganese (water)	5.0E-03	1	1.4E-05	1000
Mercury	3.0E-04 (2)	1000	8.6E-05 (2)	30
Nickel (sol. salt)	2.0E-02	300	-	-
Selenium	5.0E-03	3	-	-
Silver	5.0E-03	3	-	-
Thallium (chloride)	8.0E-05	3000	-	-
Vanadium	7.0E-03 (2)	100	-	-
Zinc (and compounds)	3.0E-01	3	-	-

NOTES

- Aluminum, calcium, iron, magnesium, potassium and sodium are considered essential nutrients and will not be quantitatively evaluated in the risk assessment

*The current drinking water standard for copper is 1.3 mg/l. The DWCD (1987) concluded that toxicity data are inadequate for calculation of a reference dose for this chemical

(1) All toxicity values obtained from IRIS (on-line September 21, 22, and 27, 1994, November 9, 10, 21, and 23, 1994, and January 10, 1995) unless otherwise noted

(2) Toxicity values obtained from HEAST Annual FY-1994.

(3) Toxicity values were verified by the Superfund Health Risk Technical Support Center. October 27, 1994.

(4) The noncarcinogenic toxicity value for chlordane is reported, as the individual alpha and gamma-chlordane isomers do not have established noncarcinogenic toxicity values.

(5) The noncarcinogenic toxicity value for endosulfan is reported, as the individual endosulfan I and endosulfan II isomers do not have established noncarcinogenic toxicity values.

USEPA WEIGHT - OF - EVIDENCE:

A - Human Carcinogen
B1 - Probable Human Carcinogen. Limited human data are available.
B2 - Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals and inadequate or no evidence in humans.
C - Possible Human Carcinogen
D - Not Classifiable as to human carcinogenicity
E - Evidence of noncarcinogenicity for humans.

TABLE 9 (cont'd)

CHEMSOL, INC. SITE
SUBCHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

CHEMICALS	NONCARCINOGENS: SUBCHRONIC REFERENCE DOSES (RfD)			
	Oral RfD (mg/kg-day)	Uncertainty Factor	Inhalation RfD (mg/kg-day)	Uncertainty Factor
Volatile Organics				
Acetaldehyde (TIC)	-	-	-	-
Acetone	1.0E+00	100	-	-
Acrolein	-	-	-	-
Benzene	-	-	1.7E-02 (2)	100
Carbon Tetrachloride	2.0E-03 (3)	300	1.7E-02 (3)	100
Chloroform	1.0E-02	1000	1.1E-02 (3)	300
Dichlorodifluoromethane	9.0E-01	100	5.0E-01	1000
1,2-Dichloroethane	- (3)	-	- (3)	-
1,1-Dichloroethene	9.0E-03	1000	-	-
1,2-Dichloroethene (Total)	9.0E-03	1000	-	-
Hexane	6.0E-01	1000	5.7E-02	300
Methylene Chloride	6.0E-02	100	8.6E-01	100
1,1,2,2-Tetrachloroethane	-	-	-	-
Tetrachloroethene	1.0E-01	100	-	-
Toluene	2.0E+00	100	2.9E-01 (2)	300
Trichloroethene	-	-	-	-
Vinyl Chloride	- (3)	-	- (3)	-
Semivolatile Organics				
Benzo(a)pyrene	-	-	-	-
Bis(2-chloroethyl)ether	-	-	-	-
Pesticides/PCBs				
Aldrin	3.0E-05	1000	-	-
Dieldrin	5.0E-05	100	-	-
Toxaphene	-	-	-	-
PCBs (Aroclors)	-	-	-	-
Inorganics				
Antimony	4.0E-04	1000	-	-
Arsenic	3.0E-04	3	-	-
Barium	7.0E-02	3	1.4E-03	100
Beryllium	5.0E-03	100	-	-
Cadmium	-	-	-	-
Chromium VI (insol. salt)	2.0E-02	100	1.1E-06 (2)	100
Manganese (water)	5.0E-03	1	-	-
Mercury	3.0E-04	1000	8.6E-05	30
Thallium	8.0E-04	300	-	-
Vanadium	7.0E-03	100	-	-
Zinc	3.0E-01	3	-	-

TABLE 9 (cont'd)

CHEMSOL, INC. SITE
SUBCHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

NOTES
- Calcium, iron, magnesium, potassium, and sodium are considered essential nutrients and are not quantitatively evaluated in the risk assessment
(1) Toxicity values were obtained from HEAST FY 1994 - Annual
(2) Toxicity values were verified by the Superfund Health Risk Technical Support Center on January 5, 1995
(3) Toxicity values were verified by the Superfund Health Risk Technical Support Center on Februrary 21, 1995.

USEPA WEIGHT - OF - EVIDENCE
A - Human Carcinogen
B1 - Probable Human Carcinogen   Limited human data are available
B2 - Probable Human Carcinogen   Sufficient evidence of carcinogenicity in animals and inadequate or no evidence in humans.
C - Possible Human Carcinogen
D - Not Classifiable as to human carcinogenicity
E - Evidence of noncarcinogenicity for humans

TABLE 10

SUMMARY OF COST ESTIMATES FOR SOIL ALTERNATIVES

ALTERNATIVE		TOTAL CAPITAL COST	ANNUAL O&M COST	TOTAL PRESENT WORTH
No Action				
	1	$388,660	$0	$388,660
Capping				
with soil	2A	$1,855,850	$2,000	$1,894,000
with asphalt	2B	$2,650,481	$175,000	$6,013,000
Off-Site Disposal				
	3	$5,573,001	$0	$5,573,000
On-site LTTD for PCBs				
on-site solidification for Lead	4A	$11,963,134	$0	$11,963,000
off-site disposal for Lead	4B	$12,241,639	$0	$12,242,000

TABLE 11

SUMMARY OF COSTS ESTIMATES FOR GROUNDWATER ALTERNATIVES

ALTERNATIVE	TOTAL CAPITAL COST	ANNUAL O&M COSTS	TOTAL PRESENT WORTH
No Action -1	$0	$59,336	$912,000
Continue Existing Interim Action			
Extract from C-1, 21gpm			
Discharge to POTW - 2A	$45,097	$452,738	$7,000,300
Discharge to Stream - 2B	$45,097	$726,336	$11,209,000
Extract from C-1, C-2, TW-4 TW-5, TW-8, DMW-9, 55 gpm			
Discharge to POTW - 5A	$390,189	$670,892	$10,699,000
Discharge to Stream - 5B	$390,189	$766,336	$12,169,000

TABLE 12

POTENTIAL ARARs /TBCs

Table 12-1
Potential Chemical Specific ARARs/TBCs
Feasibility Study For the Chemsol Inc. Site

Statute, Standard, Requirement, Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
Soil:				
Toxic Substances Control Act.	15 USC 2605	Applicable to storage and disposal of PCB and pesticide contaminated material.	Applicable	Establishes requirements for soil containing > 50 ppm PCBs.
Toxic Substances Control Act	Requirements for PCB Spill Cleanup (40 CFR 761.125)	Establishes PCB cleanup levels for soils and solid surfaces.	Applicable	Applicable to spills of materials containing PCBs at concentrations of 50 ppm or greater than occurred after February 17, 1978. These requirements may be relevant and appropriate to the evaluation of PCB levels in site soils.
Toxic Substances Control Act	Guidance on Remedial Actions for Superfund Sites with PCB Contamination (OSWER Directive 9355.4-01)	Provides guidance on identifying principal threat and low-threat areas of PCB contamination. At industrial sites, PCBs at concentrations of 500 ppm or greater generally pose a principal threat.	Applicable	Will be considered at Chemsol with respect to soil PCB contamination.
Toxic Substances Control Act	Revised interim Soil Lead Guidance for CERCLA Sites and RCRA CorrectiveAction Facilities (OSWER Directive 9355.4-12)	Recommends a screening level for lead of 400 ppm in soil for residential land use.	Applicable	Chemsol is expected to be developed for residential use. This will be considered to screen soil lead contamination levels.
Resource Conservation and Recovery and Recovery Act (RCRA)	Hazardous Waste Determination - Toxicity Characteristic (40 CFR 261.24)	Establishes maximum concentrations of contaminants for the toxicity characteristic using the test method described in 40 CFR 261 Appendix II.	Applicable	Applicable to the determination of whether soils, if excavated, require handling as a hazardous waste.

Table 12-1
Potential Chemical Specific ARARs/TBCs
Feasibility Study For the Chemsol Inc. Site

Statute, Standard, Requirement, Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
Air:				
Clean Air Act.	42 USC 7401 Section 112	Establishes limits on pollutant emissions to atmosphere.	Applicable	Pollutants deemed hazardous or non-hazardous based on public health.
National Primary and Secondary Ambient Air Quality Standards (NAAQS).	40 CFR 50	Establishes primary and secondary NAAQS under Section 109 of the Clean Air Act.	Potentially Applicable	Primary NAAQS define levels of air quality necessary to protect public health. Secondary NAAQS define levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Applicable to remedial action alternative(s) that may emit pollutants to the atmosphere.
National Emission Standards for Hazardous Air Pollutants (NESHAPs).	40 CFR 61	Establishes NESHAPs.	Potentially Applicable	Establishes NESHAPs for toxic emissions.
Ground Water:				
Safe Drinking Water Act (SDWA).	Pub. L. 95-523, as amended by Pub. L. 96502, 22 USC 300 et. seq.	Set limits to the maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs).	Applicable	The aquifer system has been designated as a drinking water aquifer by the EPA.
National Primary Drinking Water Standards.	40 CFR Part 141	Applicable to the use of public water systems; Establishes maximum contaminant levels, monitoring requirements and treatment techniques.	Applicable	Primary MCLs are legally enforceable.

Table 12-1
Potential Chemical Specific ARARs/TBCs
Feasibility Study For the Chemsol Inc. Site

Statute, Standard, Requirement, Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
National Secondary Drinking Water Standards.	40 CFR Part 143	Applicable to the use of public water systems; Controls contaminants in drinking water that primarily effect the aesthetic qualities relating to public acceptance of drinking water.	Applicable	Secondary MCLs pertain to aesthetic characteristics (taste, odor) and are not legally enforceable.
Surface Water:				
Clean Water Act (CWA).	33 USC 1251 et.seq.	Applicable for alternatives involving treatment with point-source discharges to surface water.	Potentially Applicable	Criteria available for water and fish ingestion, and fish consumption for human health. State criteria are also available.
Clean Water Act (CWA).	Ambient Water Quality Criteria (AWQC) (40 CFR 131.36(b)(1))	Non-enforceable guidelines established for the protection of human health and/or aquatic organisms.		AWQC will be applicable to remedial alternatives which involve discharges to surface water.
Clean Water Act (CWA).	Effluent Discharge Limitations (40 CFR 401.15)	Regulates the discharge of contaminants from an industrial point source.		Regulations will be applicable to remedial alternatives which involve discharges to surface water.
RCRA: Resource Conservation and Recovery Act (RCRA) - Identification and Listing of Hazardous Waste.	40 CFR Part 264.1	Defines those solid wastes which are subject to regulations as hazardous wastes under 40 CFR parts 262-265 and Parts 124, 270, 271.	Potentially Applicable	May be considered an ARAR for solids produced during groundwater treatment.
Resource Conservation and Recovery Act Maximum Concentration Limits.	40 CFR Part 264	Groundwater protection standards for toxic metals and pesticides.	Potentially Applicable	These provisions are applicable to RCRA regulated units that are subject to permitting.

Table 12-1
Potential Chemical Specific ARARs/TBCs
Feasibility Study For the Chemsol Inc. Site

Statute, Standard, Requirement, Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
Land Disposal Restrictions	40 CFR 268	Established maximum concentrations of contaminants on the basis of which hazardous wastes are restricted from land disposal.	Potentially Applicable	This regulation will be applicable to remedial alternatives which utilize land disposal of soils determined to be a hazardous waste.
Pretreatment Standards.	40 CFR 403	Establishes pretreatment standards to control pollutants that pass through or interfere with POTW treatment processes or may contaminate sewage sludge.	Potentially Applicable	Applicable to remedial action alternative that includes discharge to POTW or to a sewer system that is connected to a POTW.
State				
Soil	NJ Soil Cleanup Criteria	Non-promulgated soil criteria developed based on protection of human health or ground water quality used for developing site-specific cleanup levels.	TBC Applicable	TBCs for the evaluation of soil quality.
Groundwater and Surface Water: NJ Water Pollution Control Act	NJ Surface Water Quality Standards (NJAC 7:9B-1.14(c))	Established water quality standards for various surface water classes.	Applicable	Potential ARARs due to classification of Stream 1A near site as FW2-NT. Will affect alternatives which include discharges to the Stream 1A.
NJ Groundwater Quality Standards	NJAC 7:9-Subchapter 6	Establishes constituent standards for groundwater pollutants. It defines numerical criteria for limits on discharges to groundwater and standards for cleanups.	Applicable	Potential ARARs for groundwater alternatives.
Hazardous Waste Criteria, Identification and Listing	NJAC 7:26-Subchapter 8	Defines those solid wastes that are subject to regulation as hazardous waste	Applicable	Applies to offsite disposal of material. TCLP limits are applicable.

Table 12-2
Potential Location Specific ARARs/TBCs
Feasibility Study For Chemsol Inc. Site

Standard, Requirement, Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
Ground Water and Surface Water: Clean Water Act.	Section 404	Prohibits discharge of dredged or fill material into wetlands without a permit. Preserves and enhances wetlands.	Applicable	Requires a permit for any remedial activity that proposes to discharge dredged or fill material into wetlands.
Regulations of Activities Affecting Water of the U.S.	33 CFR 320-329	Corps of Engineers, Department of the Army regulations are codified in Title 33 (Navigation and Navigable Waters) of the Code of Federal Regulations (33 CFR Parts 200-399).	Applicable	Applicable to remedial activities that affect U.S. waters subject to Army Corps of Engineers regulations.
Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities.	40 CFR, Part 264.18	Part 264.18 establishes location standards including seismic considerations and flood plain requirements.	Potentially Applicable	May be applicable to remedial activities affected by seismic considerations or remedial activities conducted in flood plain areas.
Fish And Wildlife: Fish And Wildlife Coordination Act.	16 USC 661	Provides procedures for consultation between regulatory agencies to consider wildlife conservation during water resource-related projects.	Potentially Applicable	May be applicable to remedial activities that may affect fish and wildlife resources.
Endangered Species Act.	16 USC 1531	Requires Federal agencies to ensure that actions they authorize, fund or carry out are not likely to jeopardize the continued existence of endangered/threatened species or adversely modify or destroy the critical habitats of such species.	Potentially Applicable	Applicable to remedial activities that may affect endangered or threatened species that may exist in areas affected by the remedial activity.

Table 12-2
Potential Location Specific ARARs/TBCs
Feasibility Study For Chemsol Inc. Site

Standard, Requirement, Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
Fish And Wildlife Coordination Act.	Protection of Wildlife Habitats 16 USC 661	Prevents the modification of a stream or a river that affects fish or wildlife.	Potentially Applicable	Potential ARAR if remedial activities result in modifications to the Stream 1A which affect fish or wildlife.
Floodplain, Wetland, Coastal Zone: Executive Order On Floodplain Management.	Executive Order No 11988 40 CFRs 6.302(b) and Appendix A	Requires Federal agencies to evaluate the potential effects of actions that may take place in a floodplain to avoid the adverse impacts associated with direct and indirect development of a floodplain.	Potentially Applicable	Applicable to remedial actions that affect wetland areas.
Wetland Executive Order.	Executive Order No. 11990 Protection of Wetlands	Regulates activities conducted in a wetland area to minimize the destruction, loss or degradation of the wetlands	Potentially Applicable	Potential ARARs if a remedial action is proposed within a wetland area.
Wetland Executive Order.	Wetlands Construction and Management Procedures (40 CFR 6, Appendix Z)	Sets forth EPA policy for carrying out the provisions of Executive Order 11900. Regulates activities conducted in a wetland area to minimize the destruction, loss or degradation of the wetlands	Potentially Applicable	Potential ARARs if a remedial action is proposed within a wetland area.
Other: National Historic Preservation Act (NHPA).	7 CFR 650	Establishes regulations for determining a site's eligibility for listing in the National Registry of Historic Places.	Applicable	Requires consideration of remedial activity impact upon any property included in or eligible for inclusion in The National Registry of Historic Places.

Table 12-2
Potential Location Specific ARARs/TBCs
Feasibility Study For Chemsol Inc. Site

Standard, Requirement, Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
National Historic Preservation Act of 1966 (16 USC 470,et seq.)	16 USC 470,et seq. Protection of Historic Places	Requires actions to take into account effects on properties included in or eligible for the National Register of Historic Places and minimizes harm to National Historic Landmarks.	Potentially Applicable	Potential ARAR if activities impact areas identified as having the potential for cultural resources.
State				
Wetlands: NJ Freshwater Wetlands Protection Act	NJSA 13:9B Regulation of Activities In and Around Wetlands	Provides for classification of freshwater wetlands and establishes permit requirements for activities which impact freshwater wetlands.	Potentially Applicable	Potential ARAR if a remedial action is proposed within a wetland area.
NJ Freshwater Wetlands Regulations	NJAC 7:7	Regulates alteration or disturbance in and around freshwater wetland areas.	Potentially Applicable	Potential ARAR if a remedial action is proposed within a wetland area.
Historic Areas: NJ Conservation Restriction and Historic Preservation Restriction Act	NJSA 13:8B-1 Protection of Historic Places	Allows for the acquisition and enforcement of conservation restrictions and historic preservation restrictions by the NJDEP at historic sites.	Potentially Applicable	Potential ARAR if activities impact areas identifed as having the potential for cultural resources.

Table 12-3
Potential Action Specific ARARs/TBCs
Feasibility Study the Chemsol Inc. Site

Standard, Requirement Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
Hazardous and Solid Waste Amendments of 1984 (HSWA)	Land Disposal Restrictions	Prohibits placement of hazardous wastes in locations of vulnerable hydrogeology and lists certain wastes, which will be evaluated for prohibition by EPA under RCRA.	Potentially Applicable	Potential ARARS which may limit the use of land disposal in remediating certain hazardous wastes.
Clean Air Act	National Ambient Air Quality Standards (NAAQS)-Particulates (40 CFR 50)	Establishes maximum concentrations for particulates and fugitive dust emissions.	Potentially Applicable	ARARs for alternatives involving treatment methods which result in discharges to ambient air.
Clean Air Act	Emissions Standards for Hazardous Air Pollutants (NESHAPS) (40 CFR 61)	Establishes emissions limitations for hazardous air pollutants.	Potentially Applicable	ARARs for alternatives involving treatment methods which result in discharges to ambient air.
Hazardous Materials Transportation Act	Rules for Transportation of Hazardous Materials (49 CFR 170, 171)	Procedures for packaging, labeling, manifesting, and off-site transport of hazardous materials.	Potentially Applicable	ARARs for alternatives involving the off-site shipment of hazardous materials or waste.
Occupational Safety and Health Act	Recordkeeping, Reporting and Related Regulations (29 CFR 1904)	Outlines recordkeeping and reporting requirements.	Potentially Applicable	ARARs for all contractors/subcontractors involved in Hazardous activities.
Occupational Safety and Health Act	General Industry Standards (29 CFR 1910)	Establishes requirement for 40-hour training and medical surveillance of hazardous waste workers	Potentially Applicable	ARARs for workers and the workplace throughout the implementation of hazardous activities.
Occupational Safety and Health Act	Safety and Health Standards (29 CFR 1926)	Regulations specify the type of safety equipment and procedures for site remediation/excavation.	Potentially Applicable	ARARs for workers and the workplace throughout the implementation of hazardous activities.

Table 12-3
Potential Action Specific ARARs/TBCs
Feasibility Study the Chemsol Inc. Site

Standard, Requirement Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
Threshold Limit Values, American Conference of Governmental Industrial Hygienists.	ACGIH ISBN: 0-936712-92-9	Threshold Limit Value (TLVs) and Biological Exposure Indices (BEIs) are listed as guidelines to assist in the control of health hazards.	TBC	TLVs and BEIs were not developed for use as legal standards but may be used as a basis for a health and safety program during site remedial activities.
Groundwater and Surface Water: Clean Water Act.	33 USC 1251 et.seq.	Restoration and maintenance of chemical, physical and biological integrity of the nation's water.	Applicable	Sets standards to restore and maintain the integrity of the nation's water.
Effluent Limitations.	Section 301	Technology-based discharge limitations for point sources of conventional, nonconventional, and toxic pollutants.	Applicable	Applicable for treatment options requiring discharge either to surface water bodies or to POTWs.
Water Quality Standards And Effluent Limitations.	Section 302	Protection of intended uses of receiving waters (e.g., Public water supply, recreational uses).	Applicable	Applicable for treatment options requiring discharge either to surface water bodies or to POTWs.
Water Quality Standards And Implementation Plans.	Section 303	Requires State to develop water quality criteria.	Applicable	Applicable for treatment options requiring discharge either to surface water bodies or to POTWs.
Toxic And Pretreatment Effluent Standard.	Section 307	Establish list of toxic pollutants and promulgate pretreatment standards for POTWs discharge.	Applicable	Applicable for treatment options requiring discharge either to surface water bodies or to POTWs.
National Pollutant Discharge Elimination System (NPDES) Permit Regulations.	40 CFR 122	Establishes permitting requirements for effluent discharge.	Potentially Applicable	Applicable for treatment options requiring discharge either to surface water bodies or to POTWs.
NPDES Regulations.	40 CFR 125	Establishes criteria and standards for technology-based treatment requirements under the Clean Water Act.	Potentially Applicable	May be applicable for treatment alternatives including discharge to surface water or POTW.

Table 12-3
Potential Action Specific ARARs/TBCs
Feasibility Study the Chemsol Inc. Site

Standard, Requirement Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
Regulations on Test Procedures for the Analysis of Pollutants.	40 CFR 136	Establishes test procedures for pollutant analysis in water.	Potentially Applicable	Applicable for alternatives including discharge to surface water or POTW.
Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, USEPA Office of Emergency and Remedial Response.	EPA/540/G-88/003 OSWER Directive 9283.1-2	Provides guidance for developing, evaluating, and selecting groundwater remedial action at Superfund sites.	TBC	Guidance for selecting remedial alternative. Includes action related considerations, such as overall protection of human health and the environment, and implementability.
RCRA: Resource Conservation And Recovery Act (RCRA) Subtitle C - Hazardous Waste.	40 CFR Part 264 RCRA	Applicable to the treatment, storage, transportation and disposal of hazardous waste and wastes listed under 40 CFR Part 261.	Potentially Applicable	May be required for waste/soil disposal of treatment options.
RCRA Subtitle D - Solid Waste.	40 CFR Part 264 RCRA Subtitle D	Applicable to the management and disposal of non-hazardous wastes.	Potentially Applicable	Specifies minimum technical standards for solid waste disposal facilities.
RCRA - Part 264 Standards for Owners and Operators.	40 CFR Part 264	Standards for owners and operators of hazardous waste facilities.	Potentially Applicable	Includes design requirements for capping, treatment, and post closure care.
RCRA - Part 262 Standards for generators Part 263 Standards for transporters.	40 CFR Parts 262 and 263	Applicable to generators and transporters of hazardous waste.	Potentially Applicable	Applicable to off-site disposal or treatment of hazardous material.
RCRA - Land disposal restrictions.	40 CFR Part 268	Applicable to alternatives involving land disposal of hazardous wastes, and requires treatment to diminish a waste's toxicity and /or minimize contaminant migration.	Potentially Applicable	May be required for waste/soil disposal or treatment options.

Table 12-3
Potential Action Specific ARARs/TBCs
Feasibility Study the Chemsol Inc. Site

Standard, Requirement Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
Federal				
Transportation of Hazardous Wastes.	49 CFR 170-189	Federal Highway Administration, Department of Transportation, and National Highway Traffic Safety Administration regulations are codified in Title 23 (Highways) of the Code of Federal Regulations (23 CFR Parts 1-1399) Additional Transportation regulations are codified in Title 49 (Transportation) of the Code of Federal Regulations (49 CFR Parts 1-1399)	Potentially Applicable	Applicable to remediation alternatives that involve the off-site transportation of hazardous waste.
RCRA - Part 270 Hazardous Waste Permit Program.	40 CFR 270	EPA administered hazardous waste permit program.	Applicable	Covers the basic permitting, application, monitoring, and reporting requirements for off-site hazardous waste management facilities.
Wetlands:				
Wetland Permits.	Section 404	Applicable to remedial actions in and around wetlands.	Potentially Applicable	Applicable to treatment options involving excavation or dredging in and around wetlands if discharge to Stream 1A is chosen.
Other:				
National Historic Preservation Act (NHPA).	7 CFR 650	Regulations for determining a site's eligibility for listing in the National Register of Historic Places	Applicable	A federal agency must take into account the effect of a project on any property included in or eligible for inclusion in the National Register of Historic Places.

Table 12-3
Potential Action Specific ARARs/TBCs
Feasibility Study the Chemsol Inc. Site

Standard, Requirement Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
State				
NJ Hazardous Waste Regulations	Labeling, Records and Requirements (NJAC 7:26-7)	Requirements for hazardous waste generators.	Potentially Applicable	Potential ARARs for alternatives which involve the generation of a hazardous waste.
NJ Industrial Site Recovery Act	Hazardous Discharge Site Remediation Regulations (NJAC 58:10B-12 and 13)	Requires the documentation and maintenance of engineering or institutional controls when such are used in lieu of remediating a site; also establishes a one in one million additional cancer risk as a basis for residential and non-residential soil remediation standards.	Potentially Applicable	Potential ARARs for active remediation alternatives and for alternatives which involve the use of institutional or engineering controls in lieu of permanent remediation.
NJ Industrial Site Recovery Act	Technical Requirements for Site Remediation (NJAC 7:26E)	Establishes remedial action requirements, including workplan and reporting requirements.	Potentially Applicable	Potential ARARs for active remediation alternatives.
NJ Water Pollution Control Act	Pollutant Discharge Elimination System Permit/Discharge Requirements (NJAC 7:14A-2.1)	Requires any discharger to land or water to obtain a permit pursuant to NJSA (58:10A-1)	Potentially Applicable	ARARs for alternatives involving treatments which discharge effluents to surface or groundwater.
NJ Water Pollution Control Act	Discharge to Groundwater Requirements (NJAC 7:14A-6)	Requires any discharger to ground water to obtain a permit.	Potentially Applicable	ARARs for alternatives involving discharges to ground water.
NJ Water Pollution Control Act	Effluent Standards/Treatment requirements (NJAC 7:9B-1.6)	Establishes effluent standards and treatment requirements for discharge of toxic effluent.	Potentially Applicable	ARARs for alternatives involving treatments which discharge toxic pollutants to area water bodies.

Table 12-3
Potential Action Specific ARARs/TBCs
Feasibility Study the Chemsol Inc. Site

Standard, Requirement Criteria Or Limitation	Citation Or Reference	Description	Status	Comments
State				
NJ Air Pollution Control Act	Permits and Emissions Limitations for VOCs (NJAC 7:27-16)	Requires sources which emit VOCs be registered and permitted with the NJDEP and meet design specifications.	Potentially Applicable	ARARs for alternatives involving treatments which impact ambient air (e.g., air stripping).
NJ Air Pollution Control Act	Toxic Substance Emissions (NJAC 7:27-17)	Requirements for emissions control apparatus for sources of toxic emissions.	Potentially Applicable	ARARs for alternatives involving treatments which impact ambient air (e.g., air stripping).
NJ Air Pollution Control Act	Emergency Situations (NJAC 7:27-12)	Requirements for standby plans to reduce emissions of air contaminants during an air pollution emergency.	Potentially Applicable	ARARs for alternatives involving treatments which impact ambient air.
NJ Water Quality Planning Act (NJSA 58:4A-14)	Well Drilling Permits and Well Certification Forms	Requires NJDEP approval for drilling and construction of new wells.	Potentially Applicable	ARARs for alternatives involving installation of monitoring wells.

APPENDIX III

ADMINISTRATIVE RECORD INDEX

Document Number: CHM-001-0001 To 0147 Date: 10/02/92

Title: (Letter forwarding the enclosed Project Operations Plan for Remedial Investigation/Feasibility Study activities at the Chemsol, Inc. site)

Type: CORRESPONDENCE
Category: 3.1.0.0.0 Sampling and Analysis Plan (SAP)
Author: Goltz, Robert D.: CDM Federal Programs Corporation
Recipient: Haklar, James: US EPA
Kollar, Keith: US EPA

Document Number: CHM-001-0148 To 0471 Date: 10/02/92

Title: Project Operations Plan for Remedial Investigation/Feasibility Study, Chemsol Inc. Site, Piscataway, New Jersey, Appendices

Type: PLAN
Category: 3.1.0.0.0 Sampling and Analysis Plan (SAP)
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-001-0472 To 0594 Date: 10/14/92

Title: Chemsol, Inc., Revised Health and Safety Plan, October 1992, Contractor QA/QC Sign Off

Type: PLAN
Category: 3.1.0.0.0 Sampling and Analysis Plan (SAP)
Author: Bilimoria, Maheyar: CDM Federal Programs Corporation
Goltz, Robert D.: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-001-0595 To 0897 Date: 10/02/92

Title: (Letter forwarding the enclosed Volume 1 of the Final Remedial Investigation/Feasibility Study Work Plan for the Chemsol, Inc., site)

Type: CORRESPONDENCE
Category: 3.3.0.0.0 Work Plan
Author: Goltz, Robert D.: CDM Federal Programs Corporation
Recipient: Haklar, James: US EPA
Kollar, Keith: US EPA

==

Document Number: CHM-001-0898 To 0903 Date: 08/12/92 Confidential

Title: (Letter announcing a September 2, 1992, public meeting for the Chemsol, Inc., site, with attached list of addressees)

Type: CORRESPONDENCE
Category: 10.3.0.0.0 Public Notice(s)
Author: Katz, Steven: US EPA
Recipient: various: resident
Attached: CHM-001-0918

Document Number: CHM-001-0904 To 0907 Date: 09/02/92

Title: Public Meeting, Chemsol Superfund Site, September 2, 1992, Sign-In Sheet

Type: OTHER
Category: 10.5.0.0.0 Documentation of Other Public Meetings
Author: various: various
Recipient: none: none
Attached: CHM-001-0908

Document Number: CHM-001-0908 To 0911 Parent: CHM-001-0904 Date: 09/02/92 Confidential

Title: Public Meeting, Chemsol Superfund Site, September 2, 1992, Sign-In Sheet

Type: OTHER
Category: 10.5.0.0.0 Documentation of Other Public Meetings
Author: various: various
Recipient: none: none

Document Number: CHM-001-0912 To 0912 Date: 08/19/92

Title: (Newspaper article entitled:) EPA to present plan for contamination cleanup at Chemsol

Type: CORRESPONDENCE
Category: 10.6.0.0.0 Fact Sheets and Press Releases
Author: Glick, Andrea: Home News
Recipient: none: none

Document Number: CHM-001-0913 To 0914 Date: 08/30/92

Title: (Newspaper article entitled:) EPA targets tainted superfund site in Piscataway for extensive study

Type: CORRESPONDENCE
Category: 10.6.0.0.0 Fact Sheets and Press Releases
Author: Melisurgo, Lenny: The Star Ledger
Recipient: none: none

Document Number: CHM-001-0915 To 0917 Date: 10/01/92

Title: Chemsol Inc., New Jersey, EPA Region 2, Congressional Dist. 12 Middlesex County, Piscataway

Type: OTHER
Category: 10.6.0.0.0 Fact Sheets and Press Releases
Author: none: none
Recipient: none: none

Document Number: CHM-001-0918 To 0923 Parent: CHM-001-0898 Date: 08/12/92

Title: (Letter announcing a September 2, 1992, public meeting for the Chemsol, Inc., site, with attached list of addresses)

Type: CORRESPONDENCE
Category: 10.3.0.0.0 Public Notice(s)
Author: Katz, Steven: US EPA
Recipient: various: resident

Document Number: CHM-001-0924 To 1471 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume 1

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-001-1472 To 1531 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume 1A

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-001-1532 To 2023 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume II

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-001-2024 To 2348 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume III

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-001-2349 To 0399 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume IV

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-002-0400 To 0947 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume V

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-002-0948 To 1373 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume VI

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-002-1374 To 1709 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume VII

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-002-1710 To 2084 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume VIII

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-002-2085 To 2484 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume IX

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-002-2485 To 0581 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume X

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-003-0582 To 0740 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume XI

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-003-0741 To 1439 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume XII

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-003-1440 To 1977 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume XIII

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-003-1978 To 2435 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume XIV

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

Document Number: CHM-003-2436 To 0174 Date: 10/01/96

Title: Remedial Investigation Report, Chemsol Inc. Superfund Site, Volume XV

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: CDM Federal Programs Corporation
Recipient: none: US EPA

CHEMSOL, INC. SUPERFUND SITE
OPERABLE UNIT ONE
ADMINISTRATIVE RECORD UPDATE
INDEX OF DOCUMENTS

3.0 REMEDIAL INVESTIGATION

3.3 Work Plans

P. XXXXXX- XXXXXX Plan: Remedial Investigation and Feasibility Study Work Plan, Chemsol, Inc. Superfund Site, Piscataway, Middlesex County, New Jersey, Volume 1 of 2, prepared by U.S. EPA, Region II, June 1992.

Plan: Project Operations Plan for Remedial Investigation/Feasibility Study, Chemsol, Inc. Site, Piscataway, New Jersey, Appendices, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, October 2, 1992. (This document can be found in the Chemsol, Inc. Superfund Site, Operable Unit One, Administrative Record File, pages CHM-001-0148 to CHM-001-0471.)

Plan: Chemsol, Inc., Revised Health and Safety Plan, October 1992, Contractor QA/QC Sign Off, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, October 14, 1992. (This document can be found in the Chemsol, Inc. Superfund Site, Operable Unit One, Administrative Record File, pages CHM-001-0472 to CHM-001-0594.)

3.4 Remedial Investigation Reports

Report: Remedial Investigation Report, Chemsol, Inc. Superfund Site, Volumes 1 - 15, prepared by CDM Federal Programs Corporation, prepared for

U.S. EPA, Region II, October 1, 1996. (This document can be found in the Chemsol, Inc. Superfund Site, Operable Unit One, Administrative Record File, pages CHM-001-0924 to CHM-004-0174.)

3.5 Correspondence

Letter to Mr. James Haklar and Mr. Keith Kollar, U.S. EPA, Region II, from Mr. Robert D. Goltz, CDM Federal Programs Corporation, re: Letter forwarding the enclosed Project Operations Plan for Remedial Investigation/Feasibility Study activities at the Chemsol, Inc. site, October 2, 1992. (This document can be found in the Chemsol, Inc. Superfund Site, Operable Unit One, Administrative Record File, pages CHM-001-0001 to CHM-001-0147.)

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

P. XXXXXX-XXXXXX Report: Feasibility Study Report, Chemsol, Inc. Superfund Site, Township of Piscataway, Middlesex County, New Jersey, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, June 24, 1997.

P. XXXXXX-XXXXXX Plan: Superfund Proposed Plan, Chemsol, Inc. Superfund Site, Piscataway, Middlesex County, New Jersey, prepared by U.S. EPA Region II, August 1997.

P. XXXXXX-XXXXXX Affidavit (w/attachments) of Mr. Willard F Potter, Senior Project Director, de maximis, inc., Facility Coordinator, Chemsol, Inc. Superfund Site, prepared for U.S. EPA, Region II, October 10, 1997. (Note: This document is **CONFIDENTIAL.** It is located at the U.S. EPA Superfund Records Center, 290 Broadway, 18th - Floor, N.Y., N.Y. 10007-1866.)

4.6 Correspondence

P. XXXXXX-XXXXXX Fax transmittal, to Mr. Nigel Robinson, U.S. EPA, Region II, from Mr. Gil Horwitz, BSM, NJDEP, re: Geologist's comments to follow and if comments not accepted, explain why or call to discuss with Dave Barskey, December 3, 1996.

P. XXXXXX-XXXXXX Letter to Mr. James Haklar, Project Manager, New Jersey Superfund Branch, U.S. EPA, Region II, from Mr. Paul Harvey, Case Manager, Bureau of Federal Case Management, NJDEP, re: Draft Feasibility Study Report, Dated October 1996, Chemsol Superfund Site, Piscataway Township, December 18, 1996.

5.0 RECORD OF DECISION

5.4 Correspondence

P. XXXXXX-XXXXXX Letter to Ms. Carole Petersen, Chief, New Jersey Remediation Branch, U.S. EPA, Region II, from Mr. Bruce Venner, Chief, Bureau of Federal Case Management, NJDEP, re: Draft Record of Decision, Chemsol Superfund Site, Piscataway Township, March 25, 1998.

P. XXXXXX-XXXXXX Letter to Ms. Jeanne M. Fox, Regional Administrator, U.S. EPA, Region II, from Mr. Richard J. Gimello, Assistant Commissioner, NJDEP, re: Record of Decision, Non-Concurrence, Chemsol Site, Piscataway Township, August 27, 1998.

8.0 HEALTH ASSESSMENTS

8.1 ATSDR Health Assessments

P. XXXXXX-XXXXXX Report: Site Review And Update, Chemsol, Incorporated, Piscataway, Middlesex County, New Jersey, Cerclis No. NJD980528889, prepared by U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, (ATSDR), July 20, 1995, revised December 5, 1995.

10.0 PUBLIC PARTICIPATION

10.3 Public Notices

P. XXXXXX-XXXXXX Notice: "The United States Environmental Protection Agency Announces An Extension Of The Public Comment Period For The Chemsol, Inc. Superfund Site", prepared by U.S. EPA, Region II, undated.

P. XXXXXX-XXXXXX Letter to Interested Citizen, from Ms. Pat Seppi, Community Involvement Coordinator, U.S. EPA, Region II, re: Announcement of a 30-day public comment period beginning August 11, 1997, until September 10, 1997 and public meeting to be held Wednesday, August 27, 1997, for the Chemsol, Inc. Superfund Site, Piscataway, New Jersey, August 11, 1997.

10.4 Public Meeting Transcripts

P. XXXXXX-XXXXXX Chemsol, Inc. Superfund Site (1) Appendix - A, Public Meeting Transcript for The Proposed Plan For Final Cleanup at the Chemsol, Inc. Superfund Site in Piscataway, New Jersey, prepared by Fink & Carney, Computerized Reporting Services, Certified Stenotype Reporters, prepared for U.S. EPA, Region II, August 27, 1997; (2) Appendix - B, Responsiveness Summary - Written comments received by EPA during the public comment period, Volume 1 of 2, October 10, 1997; (3) Appendix - B, Responsiveness Summary - Written comments received by EPA during the public comment period, Volume 2 of 2, October 10, 1997; (4) Appendix - C, Proposed Plan, August 1997; (5) Appendix - D, Responsiveness Summary - Public Notice Printed in The Home News and Tribune on August 11, 1997.)

10.6 Fact Sheets and Press Releases

P.	XXXXXX-XXXXXX	Fact Sheet: Chemsol, Inc. Superfund Site, Piscataway, New Jersey, U.S. EPA, Region II, August 1997.
P.	XXXXXX-XXXXXX	Press Release: EPA proposes cleanup plan for contaminated soil and groundwater at Chemsol Federal Superfund Site in Piscataway, New Jersey, prepared by U.S. EPA, Region II, Thursday, August 21, 1997.

APPENDIX IV

STATE LETTER

Copy to: Lina
N Jel
a return
Hch?

Carole
problem? cc:

Fox
Nuozynski
Cange/Action
Bellow
Schaaf

State of New Jersey
Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

AUG 27 1998

Jeanne M. Fox, Regional Administrator
USEPA – Region II
290 Broadway
New York, N.Y. 10007-1866

Dear Ms. Fox:

Re: Record of Decision, Non-Concurrence, Chemsol Site, Piscataway Township

The New Jersey Department of Environmental Protection (Department) has reviewed the Record of Decision (ROD) for the Chemsol site which was forwarded to us on August 3, 1998. The Department cannot concur with this ROD. The primary issue is that the Environmental Protection Agency is not requiring the cleanup of PCBs to our residential criterion of .49 mg/kg but is utilizing a cleanup goal of 1.0 mg/kg. Also, EPA is not requiring that a deed notice be instituted for the property in the event that PCBs are left on-site at levels above the .49 criterion.

In the event that this primary issue could be worked-out, there are a number of secondary issues contained in our letter of March 25, 1998, which is enclosed for your reference. The only items addressed by EPA in this correspondence were comment numbers 11 and 13. If your staff would like to conduct a meeting on the issues outlined in this letter, I will ensure that Department staff are available.

Should you have any questions concerning this letter, please contact Bruce Venner, Chief of the Bureau of Federal Case Management at (609) 633-1455.

Sincerely,

Richard J. Gimello
Assistant Commissioner

Enclosure
c: Bruce Venner, BFCM

1998 SEP -2

98 SEP -1 PM 4:09
US EPA

State of New Jersey

Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

MAR 25 1998

Carole Petersen, Chief
USEPA - Region II
New Jersey Remediation Branch
290 Broadway
New York, N.Y. 10007-1866

Dear Ms. Petersen:

Re: Draft Record of Decision, Chemsol Superfund Site, Piscataway Township

The Department of Environmental Protection has reviewed the draft ROD for the Chemsol site. As discussed between Pam Lange and Lisa Jackson in a recent conference call, the Department does not anticipate concurring with this ROD due to the issues outlined below.

1. The main issue is quite similar to the Renora Superfund site. The different PCB cleanup criteria of the two agencies is the most significant problem. The Department cannot concur with the ROD unless it specifically states that if the site is not remediated to the State's 0.49 ppm residential use criterium, then a Declaration of Environmental Restriction (DER) must be established for the site.

2. Declaration for the Record of Decision, Statement of Basis - This section should state that the ROD is for on-site ground water and that the off-site ground water is not fully delineated.

3. Declaration for the Record of Decision, Description of Selected Remedy, Ground Water, third bullet - This statement is contradicted at Page 6, Paragraph 3 where it states that ground water is migrating off-site. This third bullet should be modified to state that the extent of off-site contamination needs to be determined.

4. Page 9, Paragraph 2 - The ROD should address whether the calculated risk meets the New Jersey standard of one in a million.

5. Page 12, Remedial Action Objectives, #2. - This statement is very confusing as written. Split into two sentences and delete the "technical practicable" issue.

6. Page 13, last paragraph - This section should include the requirement that a Classification Exception Area (CEA) must be established for the Chemsol site and the full extent of ground water contamination.

7. Page 16, Option A - The ROD should state that a DER would be necessary for this scenario.

8. Page 17, Groundwater Alternatives Section - A general statement should be included at the beginning of this section which states that a CEA must be established for all of the ground water alternatives.

9. Page 22, First Paragraph under "Groundwater", Last sentence - A CEA would have to be established for the on-site contamination concurrent with the remedy. An off-site CEA would be established once the extent of contamination is determined.

10. Page 28, Third Bullet under "Groundwater" - Same as number 3 above.

11. Page 30, Paragraph 2 - The last three sentences contain typos and incorrect structure.

12. Figure 1 - Does not include the town and county, address, scale, etc.

13. Responsiveness Summary - The Department has not received this document and therefore cannot provide comments at this time.

As stated above, the Department does not anticipate concurring with the ROD unless all of our comments are addressed. Should you wish to further discuss these issues, please contact me at (609) 633-1455.

Sincerely,

Bruce Venner

Bruce Venner, Chief
Bureau of Federal Case Management

c:

Paul Harvey, BFCM
John Prendergast, BEERA
Joe Marchesani, BGWPA

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
CHEMSOL, INC. SUPERFUND SITE
PISCATAWAY, NEW JERSEY

As part of its public participation responsibilities, the U.S. Environmental Protection Agency (EPA) held a public comment period from August 11 through October 10, 1997, for interested parties to comment on EPA's Proposed Plan for the Chemsol Inc. Site ("the Site") in Piscataway, New Jersey. The Proposed Plan described the alternatives that EPA considered for remediating contaminated soil and groundwater at the Site.

EPA held a public meeting at the Piscataway Municipal Complex on August 27, 1997. During the public meeting, representatives from EPA discussed the preferred remedy, answered questions, and received oral and written comments on the alternative recommended in the Proposed Plan and other remedial alternatives under consideration.

In addition to comments received during the public meeting, EPA received written comments throughout the public comment period. EPA's responses to significant comments, both oral and written, received during the public meeting and public comment period, are summarized in this Responsiveness Summary. All comments summarized in this document were factored into EPA's final determination of a remedy for cleaning up the Site. EPA's selected remedy for the Site is described in the Decision Summary of the Record of Decision.

This Responsiveness Summary is divided into the following sections:

I. Overview: This section discusses EPA's preferred alternative for remedial action.

II. Background: This section briefly describes community relations activities for the Chemsol, Inc. Site.

III. Response to Written Comments from Potentially Responsible Parties: This section provides responses to comments received from the Chemsol Site Potentially Responsible Parties (PRP) Group during the public comment period. No other written comments were received.

IV. Public Meeting Comments and EPA's Responses: This section provides a summary of commenters' major issues and concerns, and expressly acknowledges and responds to all significant comments raised at the August 27, 1997 public meeting.

V. Response to Written Comments: This section provides a summary of, and responses to, comments received in writing during the public comment period.

Appendix A: Transcript of the August 27, 1997 public meeting.
Appendix B: Written comments received by EPA during the public comment period.
Appendix C: Proposed Plan
Appendix D: Public Notice printed in the August 11, 1997 Home News and Tribune

Appendix
-A
-B
-C
-D

I. OVERVIEW

At the initiation of the public comment period on August 11, 1997, EPA presented its preferred alternatives for the Chemsol, Inc. Site located in Piscataway, New Jersey. The preferred remedy for the contaminated soils included the excavation and off-site disposal of approximately 18,500 cubic yards of contaminated soil, and backfilling of the excavated areas with clean imported fill from an off-site location, followed by grass seeding. The preferred remedy also included the installation, and pumping of additional extraction wells with discharge to the existing treatment plant and an additional groundwater investigation to determine if contaminated groundwater leaves the site, after implementation of the remedy. The preferred remedy is identical to the remedy selected by EPA for this Site.

II. BACKGROUND

The Remedial Investigation and Feasibility Study(RI/FS) and Proposed Plan for the Site were made available at the information repositories for the Site: EPA Superfund Document Center at EPA 's Region II office in New York City, and at the Kennedy Library in Piscataway, New Jersey. The notice of availability for these documents was published in the Home News and Tribune on August 11, 1997. The public was given the opportunity to comment on the preferred alternative during the public comment period which began on August 11, 1997 and concluded on October 10, 1997. In addition, a public meeting was held on August 27, 1997 at the Piscataway Municipal Complex. At this meeting, representatives from EPA answered questions concerning the Site and the remedial alternatives under consideration. It should be noted that the public comment period originally was to have ended on September 10, 1997. However, in response to a request made from the responsible parties, the comment period was extended to October 10, 1997.

III. RESPONSES TO WRITTEN COMMENTS FROM THE RESPONSIBLE PARTIES

Please note that the comments provided by the Chemsol Site PRP Group include a brief summary comment followed by a narrative which may extend to several pages. Only the summary comment has been provided below. For the full comment, see Appendix B.

Note: For ease of reference, the comments are numbered to match those in the Chemsol Site PRP Group comments. Section 1 of these comments consisted of an introduction which summarized the more detailed comments in Sections 2 and 3.

COMMENTS REGARDING PROPOSED SOIL REMEDY

PRP Comment 2.1 The remedial action objective to allow for future site use without restrictions cannot be achieved by the selected remedy.

PRP Comment 2.1.1 Because the proposed remedy would not achieve the state soil cleanup criteria, it cannot satisfy the remedial action objective to allow for future site use without restrictions.

EPA's Response 2.1/2.1.1

EPA has examined the selected soil excavation contours in light of its cleanup levels and has determined that the remedial action objectives can be met by the selected remedy. As stated in Section 2.4.2 on Page 2-9 of the FS Report, by excavating all surface soils contaminated with PCB concentrations > 1 ppm and lead concentrations > 400 ppm and isolated localized subsurface soils contaminated with PCB concentrations > 1 ppm and lead concentrations > 400 ppm. EPA believes that the selected remedy (Alternative S-3) may also comply with the State of New Jersey's PCB soil cleanup criterion of 0.49 ppm through its soil compliance averaging methodology .

There are no chemical specific ARARs for soil. However, the NJDEP has developed, but not promulgated State-wide soil cleanup criteria. EPA does not consider these levels to be ARARs. EPA's cleanup criterion for PCB contaminated soils is 1 ppm and the NJDEP's soil cleanup criterion is 0.49 ppm.

After this excavated soil is replaced with imported clean soil, according to EPA's risk assessment and PCB guidance, there will be no unacceptable risks to human health through direct contact and therefore no use restrictions will be required by EPA. As shown on revised Figure 2-2 of the FS Report, the subsurface soils represented by soil borings SB-74 and SB-76 will also be excavated because they are contaminated with VOCs and may serve as a continuing source of groundwater contamination. At soil boring SB-76, the VOC contaminated subsurface soil also contains the highest concentration of PCBs (5.8 ppm) in the site subsurface soil. Hence, removing these isolated localized "hot spots" may result in the State of New Jersey's PCB soil cleanup criterion of 0.49 ppm to be met . If it is later determined the New Jersey 0.49 ppm criteria is not met, additional excavation can be performed by the PRPs or the State can pay for the added cost of excavation if the remedy is funded under Superfund. If additional excavation is not performed, New Jersey will require that some restriction be put on the property. The nature of the restriction will depend on the nature of the PCB contamination above 0.49 ppm.

PRP Comment 2.1.2 If the remedial action objectives are revised to consider the State soil cleanup criterion, a new remedial alternative analysis must be performed to comply with the NCP, as a remedial alternative which complies with the State's soil cleanup criterion was not previously evaluated and is expected to result in significantly greater costs and increased risk to human health and the environment. (The comment goes on to make several assertions regarding the soil excavation volumes and costs associated with the State soil cleanup criterion of 0.49 ppm for PCBs).

EPA's Response 2.1.2

As stated in the response to comment 2.1 and 2.1.1 above, there is no reason to revise the remedial action objectives. The selected remedy (Alternative S-3) will comply with EPA's cleanup criterion of 1 ppm and based on available data, may also meet the State of New Jersey's PCB soil cleanup criterion of 0.49 ppm. The costs for Alternative S-3 which are shown on Table 4-6 in the FS Report include both scope and bid contingencies and so there will be no significant greater costs. Table 5-2 of the FS report provides the sensitivity of the cost estimates due to change in estimated volumes of contaminated soil. There will also be no need to conduct a new remedial alternative analysis, because the one performed in the FS report is in full compliance with the NCP.

Note that Superfund requires compliance with applicable or relevant and appropriate requirements (ARARs). EPA does not agree that the NJDEP PCB cleanup criterion is an ARAR. EPA considered this a "to-be-considered" requirement [(40 CFR 300.5) (SARA 122d(2c)] since it is not a promulgated standard. EPA has chosen to adopt its own PCB cleanup level of 1 ppm, rather than the State's non-promulgated criterion.

PRP Comment 2.1.3 The selected soil remedy cannot satisfy the remedial action objective to allow for future site use without restrictions based on the significant present and anticipated future environmental and physical development constraints located on the site.

EPA's Response 2.1.3

As stated in the response to comment 2.1.1, Section 2.4.2 on page 2-9 of the FS Report clearly recognizes that certain portions of the property are being used and will be used in the future for groundwater extraction, treatment, and discharge. The FS report also recognizes that groundwater in the fractured bedrock aquifer underneath the Chemsol site is contaminated and is likely to remain contaminated for a long period of time. In the context of the Superfund program, land use restrictions on a property are solely based on the level of contamination above a specific contaminant concentration (the soil cleanup criteria or action levels for PCBs and lead). The ability to develop or not develop a property based on considerations of total available acreage or the presence or absence of wetlands is not applicable. Such "use restrictions" would be present even if the property being considered for development were totally free of any chemical contamination.

PRP Comment 2.2 The selection of the remedy is not supported by the administrative record.

PRP Comment 2.2.1 By requiring the soil be disposed as a hazardous waste, the Proposed Plan proposes a remedy not evaluated by the FS, contrary to the requirements of the NCP.

EPA's Response 2.2/2.2.1

The PRP Group may have misinterpreted the Proposed Plan. The Proposed Plan does not anticipate any soil to be disposed of as hazardous waste. It merely states that disposal would take place at a licensed and approved disposal facility. EPA believes that it is highly probable that most of the PCB contaminated soil could be taken to a licensed Subtitle D facility for disposal. It is possible that isolated very small portions of the PCB contaminated soil may have to be taken to a licensed Subtitle C or TSCA regulated facility for disposal if the concentration is 50 ppm or greater.

Please note that samples collected for TCLP analysis during the RI were collected along a systematic grid across the entire Lot 1B of the site property and are as such considered to be representative samples for the area to be excavated. It is therefore incorrect to state that the selected remedy (Alternative S-3) is not supported by the administrative record or that it is contrary to the requirements of the NCP. All samples taken and analyzed for TCLP, passed the TCLP test.

PRP Comment 2.2.2 Should soil sampling during remedial design reveal a larger volume of soil requiring excavation, the remedy must be re-evaluated as selection would not be based on all relevant facts, information, and alternatives.

EPA's Response 2.2.2

Costs estimates in the Record of Decision are generally +50% - 30%. The specifics of the remedy (i.e., actual amount of soil and area of excavation) are determined during the remedial design stage. If, during the remedial design of the remedy, a larger volume of soil is required for excavation and differs significantly from the remedy selected in the Record of Decision with respect to scope, performance, or costs, EPA may require a re-evaluation of the remedial alternatives. This re-evaluation can be performed through an Explanation of Significant Differences (ESD). ESDs are utilized to describe modifications to the remedy chosen in the ROD due to site-specific conditions that may be discovered during remedial design. Based on the Administrative Record, EPA believes that the remedy currently selected in this Record of Decision most appropriately complies with the NCP criteria.

PRP Comment 2.2.3 Stockpiled soils meeting the criteria for backfill should not be required to be disposed of, but should be permitted to be used as backfill.

EPA's Response 2.2.3

It is EPA's understanding that soils presently stockpiled behind the groundwater treatment plant were put there under protective cover, because they are either hazardous, contaminated, or do not meet the New Jersey soil cleanup criteria. If additional future sampling performed during remedial design indicates that some portions of these soils are not contaminated or hazardous and meet all of the New Jersey soil cleanup criteria then they can be used as backfill.

PRP Comment 2.3 A selection of soil capping as the remedial alternative is supported by the administrative record.

EPA's Response 2.3

In selecting the preferred alternative, EPA evaluated all of the alternatives based on the nine criteria. Especially important in the case of the capping alternative is the criterion regarding long-term effectiveness and permanence. EPA did not select capping as the preferred remedy because soil contamination above the soil cleanup criteria would be left in place indefinitely requiring long term monitoring. In addition, the capping alternative, does not meet the remedial objective for unrestricted use. The selected soil remedy is cost-effective as it has been determined to provide greatest overall long-term and short-term effectiveness in proportion to its present worth cost, $5.6 million with no annual operation and maintenance. Alternative S-4(A and B) would provide an equivalent level of protection, but at almost twice the cost [$11.96 - $12.24] million. Alternative S-2A (Capping with Soil), is estimated to cost $1.9 million, which is less than the selected remedy, but since contamination would be left on site, Alternative S-2A would not provide a high degree of long-term effectiveness and would be more permanent.

PRP Comment 2.3.1 The Proposed Plan is not consistent with the EPA guidance on which soil cleanup levels were based; consequently, the remedy selection should be reconsidered as these guidance documents recommend capping for sites with contaminant concentrations at the levels present at the Chemsol site.

EPA's Response 2.3.1

EPA disagrees with this comment. EPA notes that its PCB guidance (Solid Waste and Emergency response, Directive 9355.4-01 FS, August 1990) is currently being revised to reflect changes in how risks associated with PCBs are calculated by EPA as well as recent changes in PCB regulations. EPA's Proposed Plan is consistent with the goals and expectation for Superfund cleanups as outlined in the National Contingency Plan, 40 CFR Part 300 (the "NCP"). Although the PCB guidance is being re-evaluated, EPA notes that its selected remedy is entirely consistent with the guidance as currently written. EPA notes that, for a future residential area, its PCB guidance recommends either on-site or off-site containment of soil with PCB concentrations below 100 ppm. The comment seems to misinterpret the PCB guidance as saying that containment should occur on-site. This is an incorrect interpretation of the guidance. EPA's PCB guidance does not dictate on-site or off-site containment of PCB-contaminated waste. The decision-making process to determine whether on-site or off-site containment is appropriate is part of the detailed analysis of alternatives as outlined in the NCP. EPA's PCB guidance merely discusses some of the unique factors associated with response actions at PCB-contaminated sites that might be considered under the detailed analysis of alternatives. Therefore, EPA's selected remedy, excavation and off-site containment of PCB contaminated soils is entirely consistent with the current PCB guidance and the NCP.

Cleanup standards are primarily selected based on site specific human health and ecological risk assessment. The risk assessment showed that soils contaminated with PCBs greater than 1 ppm and lead greater than 400 ppm posed unacceptable risks. Removing these PCBs and lead contaminated soils would also remove co-mingled VOCs, thereby speeding up the groundwater cleanup. In addition, VOC contaminated soils would also be excavated from deeper soils in selected areas such as in the areas around borings 74 and 76. While Guidances may be helpful in making determinations as to the appropriate cleanup standards, they do not constitute rule making by the Agency and the Agency may take action at variance with the guidance based on the facts and information for a particular Superfund site. EPA believes that the soil clean up levels chosen are consistent with EPA's guidance documents and EPA site specific risk assessment.

PRP Comment 2.3.2 The FS and Proposed Plan overestimate the costs of capping, resulting in an invalid cost comparison.

EPA's Response 2.3.2

EPA does not agree that it has overestimated the costs of capping resulting in an invalid costs comparison. The physical properties of a soil required for the purposes of constructing an engineered cap are necessarily different from those required for merely backfilling an excavation. Also, please note that the acreage of the cap and the acreage of the area requiring excavation are different by design. The excavation contours have an irregular shape and they have been designed to remove the bare minimum of soil that is contaminated above the cleanup criteria defined for lead and PCBs in the FS and the Proposed Plan. The cap will be constructed using a regular shaped area that completely covers the irregular shaped contaminated soil area and allows for proper surface water infiltration and drainage. That is why the area to be capped is necessarily larger than the area to be excavated.

Further, stockpiled soils have been dealt with in the FS and the Proposed Plan in the same consistent manner in both the capping alternative (S-2A) and the preferred alternative (S-3), so that a proper unbiased comparison can be made between the various alternatives. EPA's cost comparison is fully valid and completely consistent with relevant EPA guidance on costing of alternatives for a RI/FS and the NCP.

COMMENTS REGARDING PROPOSED GROUNDWATER REMEDY

PRP Comment 3.1

Geologic and contaminant-related factors dictate that a Technical Impracticability ARAR waiver should be granted and the remedial action objective be revised accordingly to seek containment of the contaminated groundwater.

EPA's Response 3.1

Please note that the remedial action objective in the Proposed Plan and FS Report clearly states that the goal of the selected remedial action is to contain the contaminated groundwater (that which is above Federal and State MCLs) from all depth zones and, as an element of this containment, reduce the mass of contaminants to the maximum extent possible. The remedial action objective further states that another goal of the selected remedial action is to augment the existing interim remedy as necessary, in order to achieve these goals. The FS report also states that aquifer restoration is highly unlikely in this fractured bedrock, precisely because it recognizes the potential existence of DNAPLs. The Proposed Plan also states that, if after implementation of the remedy, it proves to be technically impracticable to meet groundwater quality standards, EPA would seek waivers for such standards. Performance data from any groundwater system selected for the Site would be used to determine the parameters and locations (both horizontally and vertically) which may require a technical impracticability waiver. The goals of containing the most contaminated water to prevent offsite migration and reducing the contaminant mass to the maximum extent possible are not necessarily mutually exclusive. The interim remedy groundwater treatment plant is currently performing very similar reduction in contaminant mass as is envisioned for the selected remedy. The current interim remedy groundwater extraction system, however, does not contain all of the contaminated groundwater across the site from all depth zones and this has been clearly demonstrated by measurements made over the past several years of operation. The decision to waive ARARs can only be made after a sufficient amount of performance data from the selected groundwater extraction and treatment system becomes available. EPA does not believe that sufficient data exist to support a technical impracticability ARAR waiver at this time.

PRP Comment 3.2

The remedial action objectives in the Proposed Plan must conform to those in the FS because the remedy selection is based on the screening and evaluation of alternatives presented in the FS.

EPA's Response 3.2

The remedial action objectives stated in the FS Report and in the Proposed Plan are not different but rather complementary. The purpose of the Proposed Plan is to supplement the RI/FS, briefly describe the remedial alternatives analyzed by the agency, propose a preferred remedial action alternative, and summarize the information relied upon to select the preferred alternative. The Proposed Plan gives notice to the public and an opportunity for them to comment on the selected remedy.

With respect to the Chemsol Site, the Proposed Plan merely seeks to recognize that over time, there may some portions of the aquifer that are unlikely to be technically practicable to restore . The Proposed Plan also states that there may be other portions of the same fractured bedrock aquifer where the groundwater quality does improve with time due to operation of the selected groundwater remedy, and therefore, such portions of the aquifer could be restored to Federal and State drinking water standards. The determination of the horizontal and vertical extent of the above referenced portions of the aquifer that can and cannot be remediated is not possible based on all of the information gathered at present and will require further offsite investigations.

PRP Comment 3.3

The EPA uses a "preliminary" groundwater model in its remedy selection, resulting in misinterpretation of key model parameters and, consequently, a remedy selection process based on incomplete and, at times, inaccurate information.

EPA's Response 3.3

The following responses are to the main points raised in this section. The discussion of conceptual and numerical models in the RI and the FS reports clearly recognized the limitations of the models and the existence of data gaps in the vast body of information gathered during the RI/FS. EPA has reviewed the groundwater model submitted by Eckenfelder, Inc., the Chemsol Site PRP Group technical consultants. EPA believes that this model is not necessarily any better and has many technical limitations and unresolved problems of its own. In particular, the Chemsol PRP Site Group criticized the EPA's conceptual model as mapping groundwater elevations based on depth below ground surface without regard to hydrostratigraphic zones. Yet, the Eckenfelder numerical model uses horizontal layers that do not necessarily account for the dipping stratigraphic layers. (For a more complete discussion, see the separate technical review comments prepared for EPA by CDM Federal Programs Corporation in Section 4 of this Responsiveness Summary.)

The FS model (CDM's DYNFLOW model which is a true 3-dimensional model that directly accounts for the dipping stratigraphic layers) incorporated the major known features of the local groundwater system, both on site and off site. It was reasonably well calibrated to two comprehensive water level data sets: one without recovery pumping and one with recovery pumping at the site. By using these two comprehensive water level data sets, EPA believes that the model results are reliable. It is appropriate, however, that a more refined model may be developed prior to final design. The conceptual model incorporated into the FS numerical model is very similar to the conceptual model presented by Eckenfelder Inc. The FS model explicitly represents a system of dipping stratigraphic aquifer units as described by Eckenfelder, including a sequence of relatively conductive layers separated by relatively low permeability layers (e.g. the gray shale marker beds) which provide some hydraulic confinement to the aquifer units. One difference between the conceptual models is that the FS model explicitly includes a "deep conductive zone" identified for a portion of the interval between the gray shale marker units, while the Eckenfelder conceptual model represents the interval between the gray shale marker layers as a single "Principal Aquifer" layer.

The PRP Group also objected to EPA's inclusion of the car wash well in its groundwater model. EPA decided to include the car wash well after observing its operations during groundwater sampling at off-site locations.

The interval between the gray shale units ("Principal Aquifer") was represented in the FS model by a lower conductivity "Red Shale" property set above and below a "Deep Conductive" layer of limited thickness. The composite hydraulic conductivity for the interval is actually somewhat less than that assigned to the "Principal Aquifer" by Eckenfelder. The "Regional Shale" aquifer property set, which has a horizontal hydraulic conductivity of 25 feet/day in the strike direction, was not used for the interval between the gray shale units in the FS model. The FS model was reasonably well calibrated to site conditions both with and without recovery pumping in long term operation. A comprehensive set of site water level data was available and used for comparison with model simulated results for each case.

It was, indeed, incorrect to state in the FS Report that DYNFLOW is "certified" by the International Ground Water Modeling Center (IGWMC). However, the DYNFLOW and DYNTRACK codes have been reviewed and tested by the IGWMC at the request of USEPA. Subsequent to this review the codes were adopted for use on a particular site by USEPA. Since that time, DYNFLOW and DYNTRACK have been used on a number of USEPA Superfund sites. EPA's consultant would be willing to make DYNFLOW and DYNTRACK available free of charge to the Chemsol Site PRP Group for use on this study. Similar arrangements have been made in the past. Generally, the codes are available for sale to consulting organizations and others; a number of consulting companies have purchased DYNFLOW and DYNTRACK in the past few years.

PRP Comment 3.4

The capture zones should be defined by a refined, calibrated groundwater model.

EPA's Response 3.4

The competing effects of the "car wash well" and Site groundwater extraction wells clearly have a significant influence on the capture zones. The FS model allowed for offsite pumping from the "car wash well." EPA agrees that the FS model should be further refined and calibrated during remedial design. However, the current Eckenfelder model is not the refined and calibrated model that both EPA and the PRP Group are seeking. The Eckenfelder model has significant problems with the way boundary conditions have been defined and the recharge rates used in the model are much lower than other studies from the same area of New Jersey. No quantitative justification was provided for those lower recharge rates.

PRP Comment 3.5

Off-site delineation sampling should be limited to the area down gradient of the Site, as defined by the refined groundwater model.

EPA's Response 3.5

Please note that the observed gradients in various stratigraphic zones at the Chemsol site are relatively flat and they can be strongly influenced by offsite pumping. Hence, defining the area "down gradient" of the site is difficult and can vary with time. Definition of such "down gradient" areas is better performed through actual offsite investigation measurements than by relying on a groundwater model alone. Naturally defined "down gradient" areas can only be determined in an idealized imaginary situation where there are no external pumping sources that alter and sometimes reverse gradients.

PRP Comment 3.6

The final remedy must consider the significant constraints on the groundwater treatment plant discharge.

EPA's Response 3.6

The total flow rates defined in the existing interim remedy permit for discharge to the MCUA sewer system and the NJDEP surface water discharge permit equivalent are based on the March 1994 Final Remedial Design Report. These total flow rates are not absolute numbers that can be considered to be valid constraints. The designed capacity of the existing groundwater treatment plant is 50 gpm. EPA required the construction of both discharge pipelines (to the MCUA and to Stream 1A) in 1994, because EPA always anticipated that MCUA could decide in future to stop accepting discharges of partially treated groundwater from Superfund sites. Stream 1A clearly has more than sufficient flow capacity to accept rates defined in the selected remedy. The extraction system has to be designed to achieve capture of all of the contaminated groundwater from all depth zones and to achieve the remedial action objectives. The selected remedial extraction system for Alternative GW-5 in the FS Report was designed to capture groundwater from the most contaminated wells based on two rounds of sampling conducted during the RI.

PRP Comment 3.7

The requirement to operate the biological treatment plant if the groundwater treatment plant discharges to surface water has no technical basis.

EPA's Response 3.7

It is incorrect to state that the options in the selected groundwater remedy have no technical basis. The construction of the biological treatment plant was based on the March 1994 Final Remedial Design Report. This design was recommended to EPA by the Chemsol Site PRP Group based on the findings of the treatability studies performed in 1992 by consultants chosen by the PRP Group's Design Engineer. The selected remedy is based on the existing treatment system which in turn is based on the above referenced design. It is also irrelevant to state that a supplemental food source would have to be added to establish adequate biofilm growth. EPA's quarterly and semi-annual inspections of the existing treatment plant have observed that biofouling of the air stripper packing material occurs regularly and that frequent backwashing of the pressure filtration media is required due to accumulation of biosolids in the filter cake. In fact regular preventive measures are implemented by Bigler Associates (current plant operator) to destroy this biofilm that is very persistent. Biofilm growth in the existing treatment system as operating currently is well documented in the Chemsol Site PRP Group's reports to EPA. If the treatment plant can achieve surface water discharge standards defined by NJDEP, without operating the biological treatment system, then such data should be provided to EPA for evaluation. A limited amount of data has been presented to show that the effluent may be able meet toxicity requirements of the surface water discharge permit. However, no data has been provided to explain how other permit parameters such as phosphorus and total dissolved solids would be satisfied.

PRP Comment 3.8

A refined, calibrated groundwater model should be used to develop any long-term monitoring program.

EPA's Response 3.8

As stated in the response to previous comments, EPA expects that the FS groundwater model will be further refined and calibrated with more investigative data collected during remedial design. The sampling requirements stated in the Proposed Plan are completely consistent, relevant, and necessary to evaluate and monitor performance of the selected remedy. They can not be eliminated.

EPA'S RESPONSE TO POTENTIALLY RESPONSIBLE PARTIES' COMMENTS REGARDING THE RI REPORT

EPA examined Eckenfelder's Technical Review of the Chemsol Site Remedial Investigation (RI) Report.

Eckenfelder has presented a revised conceptual hydrogeologic model of the Chemsol Site, based on their review of the RI Report and additional review of previous data. They clearly state in Section 1 of the Monitoring Report[1] that because of the complexity of the site, additional revision may be required as additional data are obtained. This is an entirely reasonable stipulation. Furthermore, in Section 1 of the Technical Review they state that the document is ".. intended to facilitate a technical dialog between the USEPA and the Chemsol Site PRP Group (Group) regarding the issues related to site remediation." This is another commendable and entirely reasonable idea.

The EPA and Eckenfelder conceptual hydrogeologic models of the Site are not identical, but they share a number of common ideas. Just as Eckenfelder has observed that additional revision of the model may be appropriate, there are some aspects of the EPA model that might be reconsidered.

Eckenfelder's primary criticism of the RI Report relates to the grouping of monitoring wells. In Section 2.1 of the Technical Review, Eckenfelder concurs with several conclusions EPA made regarding behavior of the aquifer based on observations from the packer testing program, but then states that EPA ignored their own observations and grouped monitoring wells strictly on the basis of elevation. It is true that elevation was considered as an important aspect of the well grouping, but it was not the only one. Stratigraphic relationships and hydraulic connections were considered as well by EPA.

It is possible that Eckenfelder's criticism is based at least in part on a misinterpretation of the RI Report. On page 2-2 of the Technical Review, they cite RI Figure 3-23 as an example of EPA grouping wells in separate hydrostratigraphic units. It is true that water elevations observed in wells above and below the gray shale are plotted on a single map. However, it is clearly shown on the figure and explicitly stated in the text of the report that the water levels were not contoured together, and were not to be considered representative of a single hydraulic zone.

What is not apparent is the rationale for Eckenfelder's statement that the zone represented by the TW-series wells above the gray shale is an aquitard, and therefore not appropriate for mapping of horizontal hydraulic gradients. There is no doubt that this zone has lower hydraulic conductivity than the highly fractured zone immediately above the gray shale and some relatively highly fractured zones observed in the zone between the upper and lower gray shales. It does not necessarily follow, however, that the zone deserves classification as an aquitard. EPA is not aware of any evidence that the conductivity of this zone is significantly lower than what might be called "average" Brunswick Shale. Furthermore, the zone certainly has a horizontal component of flow. If Eckenfelder believes

---

[1]Monitoring Report was submitted with Potentially Responsible Parties' comments on EPA's RI Report.

that the magnitude of that component is small enough to be ignored, they should support that position with data.

Eckenfelder points out in Section 3 of the Technical Review that vertical head losses indicate that there are zones of moderate to low vertical conductivity. There is a reasonable vertical head loss between some of the TW-series wells and the C-series wells immediately above the shallow gray shale. Specifically, significant vertical head differences (several feet) are observed at the TW10/C-7 and TW-11/C-6 clusters. However, the vertical head differences at the TW-3/C-8, TW4/C-10 and TW-2/C-9 clusters are on the order of only a few tenths of a foot. Classification of the zone as an aquitard on the basis of vertical head loss, therefore, does not seem justified.

The argument that the TW-series wells above the gray shale should not be considered as part of the aquifer because they are within the upper, presumably weathered rock zone could also be applied to the TW-series wells below the gray shale, which Eckenfelder has grouped in the primary aquifer. As noted above, some of the TW-series have heads several feet higher than wells completed at the same location but in deeper intervals. The August 29, 1994 pre-pumping water elevations in wells TW-7, TW-14 and TW-15 are in the same range (about 62 feet above sea level), but there are no deeper wells similar to the C-series for evaluation of vertical head loss.

No wells open to zones monitored by the TW-series wells above the gray shale were pumped during the EPA packer testing program, or during any of the previous groundwater investigations. Therefore, the hydraulic properties of this zone can only be estimated. Eckenfelder used the Neuman-Witherspoon method to estimate vertical hydraulic conductivity for both the unit they call the principal aquifer (between the upper and lower gray shales) and the upper bedrock (the zone monitored by the TW-series wells above the upper gray shale, identified as an aquitard). The K_v of the principal aquifer calculated was 3.5×10^{-4} cm/sec. Two values were calculated for the upper bedrock zone. At the C-8/TW-3 cluster, the K_v was 1.1×10^{-4} cm/sec, and at the C10/TW-4 cluster, K_v was 6.5×10^{-5} cm/sec. It is noted that these values are lower than the one estimate for the principal aquifer, but not much lower.

Eckenfelder has defined the thickness of the upper permeable aquifer (the zone monitored by the C-series wells above the upper gray shale) as 40 feet. They do not provide any rationale for selecting this thickness. Based on EPA observations, a thickness of 15 to perhaps 20 feet for this zone is more realistic. Using EPA's observed thickness of the highly permeable zone, the thickness of the upper bedrock in the vicinity of the C-8/TW-3 and C10/TW-4 clusters is 100 feet and 90 feet, respectively.

It is reasonable to assume that horizontal hydraulic conductivity (K) is at least 10 times K_v. In their previous submissions, Eckenfelder estimated that K was as much as 33 times K_v. If a 10-fold difference is assumed, and units are converted from cm/sec to gpd/ft^2, the estimated values of K at the clusters discussed above are 23 gpd/ft^2 and 14 gpd/ft^2, respectively. Multiplying these values for K by the respective thicknesses, transmissivity (T) values at the cluster locations of 2,300 gpd/ft and 1,260 gpd/ft, can be estimated. Compared with estimates of T for other zones presented in Table 3-1 of the Technical Review (>5,000 gpd/ft to 29,000 gpd/ft), it is obvious that these values are lower. However, they are within a range that is generally observed in moderately productive aquifers.

Based on the above discussion, the Chemsol PRP group must make the following modifications in classifying the hydrostratigraphic units at the Chemsol Site;

●Overburden Zone (OZ) - This unit is the shallowest water-bearing unit at the site. It is composed of the thin unconsolidated soils and the weathered bedrock. It is monitored by all the OW-series wells (and perhaps the shallow PZ-series piezometers). The zone has been defined in this manner in both the RI and the Eckenfelder Technical Review. Groundwater flow is generally north to northeasterly, and the zone likely interacts with shallow surface water.

●Upper Bedrock Zone (UBA) - The UBA stratigraphically overlies the upper gray shale. At the site, the UBA thickens down dip (to the northwest) from a feather edge to nearly 200 feet. The shallowest part of the UBA may have some weathered, low permeability areas, and is likely influenced by local surface features. A highly fractured sub-unit (UBFZ) exists within the UBZ, immediately above the shallow gray shale. The UBFZ contains some of the most productive zones observed during the packer testing program.

Wells monitoring the shallow part of the UBA include TW-1, TW-2, TW-3, TW-4, TW-5, TW-5A, TW-10, TW-11 and TW-12. Wells monitoring the UBFZ include C-6, C-7, C-8, C-9 and C-10. It should be noted that TW-11 and TW-12 are included in the UBA on the basis of stratigraphic position only.

Pre-pumping hydraulic gradients in the UBA suggested generally southerly flow from the northern site boundary to the vicinity of well TW-4, where discharge to the UBFZ may be occurring. The pre-pumping hydraulic gradient in the UHPZ is not well defined. It was generally northerly on the August 29,1994 measurement, but, as shown in the RI report, significant fluctuations were observed in the C-series wells, which were considered likely indications of external pumping influences.

●Shallow Gray Shale Aquitard (SGSA) - This approximately 15-foot zone apparently acts primarily as an aquitard. The packer testing program did note some hydraulic communication across the shallow gray shale, but in most cases the communication could be correlated with open bore holes across the shale unit. Three of the TW-series wells (TW-6, TW-8 and TW-14) completely or partially straddle the shallow gray shale within the general area in which the unit subcrops. It is likely that the topographic position (i.e. shallowest water zone at their location) is more important than stratigraphic position of these wells. However, as discussed below, these wells will be grouped with the underlying zone.

●Upper Principal Aquifer (UPA) - This zone includes the upper 100 feet of shale stratigraphically below the SGSA. The 100-foot limit is essentially an arbitrary boundary applied for mapping purposes.

Wells included in the UPA are: TW-6, TW-7, TW-8, TW-9, TW-13, TW-14, TW-15, C-3, C- 4, C-5, DMW-9 and DMW- 10. As noted above, three of the TW-series wells completed within the SGSA Well TW-6 showed far greater hydraulic response during packer tests pumping from below the SGSA than above. Therefore, it is grouped with the UPA wells. Wells TW-14 and

TW-15 are included primarily on the basis of stratigraphic position. The extent of hydraulic connection between these wells and the main part of the Site is not known. It should be noted that since they are shallow wells, are completed in potentially weathered rock, are located some distance from the Site, are separated from the Site by a railroad right-of-way with associated drainage ditches and other structures, there is a distinct possibility that heads measured in the wells are not directly related to heads measured in other wells in the group. Figure 4-4 of Eckenfelder's Technical Review of the RI report shows the August 29, 1994 water elevations in the UPA. If wells TW-14 and TW-15 were not included on the map, the overall magnitude of the northerly gradient would drop from about 0.003 to less than 0.001. Eckenfelder's conclusion that pre-pumping flow was northerly must be used with caution. It was apparently northerly on August 29, 1994, but it would not have required much off-site influence to significantly change the direction of the hydraulic gradient.

●Intermediate Principal Aquifer (IPA) - This zone is similar to Eckenfelder' s proposed Lower Principal Aquifer. Eckenfelder proposed a well grouping for mapping purposes to include the portion of the principal aquifer below approximately a 100-foot stratigraphic thickness, but above the lower gray shale). The packer testing program did not show any significant hydraulic barrier at the lower gray shale, with the possible exception of the off-site influences noted at wells DMW-1 and DMW-2. Because of the lack of evidence for a significant barrier, grouping based on position relative to the shale seems unnecessarily arbitrary. By using the shale, Eckenfelder has placed both wells at the DMW-5 /DMW-6 cluster above the shale and both wells at the DMW-3 / DMW-4 cluster below it. It seems more appropriate to recognize depth, and separate wells in cluster locations.

The IPA includes wells DMW-l, DMW-3, DMW-5, DMW-7, DMW-11, C-2 and MW-104. The August 29, 1994 gradient in this set of wells was northerly, at low magnitude.

●Deep Principal Aquifer(DPA) - This is the bedrock zone primarily below the lower gray shale. As discussed above, it seems more appropriate to move MW-104 and DMW-3 to the Intermediate group, based on the lack of an identifiable hydraulic barrier and grouping wells of approximate equal elevation. For the same reasons, MW-103 and DMW-6 are included in the DPA. The DPA includes, therefore, wells MW-103, DMW-6, DMW-8, MW-101, DMW-2, MW-102 and DMW-4.

Eckenfelder did not plot a contour map for the deep group. The August 29, 1994 data plotted for the DPA wells show a very flat gradient, generally to the southeast.

There is one additional unexplained item in the effectiveness Monitoring Report. Eckenfelder did not use the elevation for well C-4 on the contour maps of the UPA for January 2 and February 6, 1997. A note on the maps states that the elevations were anomalous compared with the historic data. The "anomalous" values were 56.65 and 58.01 feet, respectively. Considering that recorded elevations for well C-4 vary, Eckenfelder plotted and used the 60.16 feet elevation measured on March 12, 1997. Considering that the August 29, 1994 elevation for well C-4 was 58.2 feet, and the previously reported values vary from less than 53 to greater than 60 feet, the classification of the January and February 1997 values as anomalous must be explained.

EPA'S RESPONSE TO TECHNICAL COMMENTS ON POTENTIALLY RESPONSIBLE PARTIES' EVALUATION OF GROUNDWATER EXTRACTION ALTERNATIVES

KEY ISSUES

Model Boundary Conditions

The description of model boundary conditions provided in Appendix A does not present a clear and consistent relationship between the model boundary conditions and field conditions.

> It is difficult to understand how a river boundary condition was appropriately applied to all of the model layers at the northwestern boundary which corresponds (in plan) with Bound Brook. At Bound Brook, the stratigraphic units represented in the model would have dipped hundreds of feet below the river. River boundary parameters were not provided in the Appendix.
>
> The General Head boundary condition parameter values applied at the northeast and southwest model boundaries were not documented. An explanation of how these values were derived is also needed.
>
> Insufficient justification was provided for applying a uniform rate of inflow at the upper model boundary. Downdip, there might be flow out of the stratigraphic unit represented by the top model layer to the overlying shale. If the top model layer was intended to represent the overlying shale to the northwest as well as the "Upper Aquitard" unit described at the Site, then the increase in thickness of this layer to the northwest (downdip) must be accounted for.
>
> No justification was provided for specifying a no-flow boundary condition at the bottom of the model. Near the subcrop to the southeast, there may be leakage into or out of the aquifer unit represented by the bottom model layer.

Recharge

Previous model studies in the area have used recharge rates of 8.2 inches/year (Brown, 1994) and 6 inches/year (CDM, 1996). The model being reviewed uses a much lower recharge rate of 2 inches/year at subcrop areas. It is assumed that most of the surface recharge is diverted by the overburden, which is not included in the model, before reaching the shale. More detailed, quantitative justification for the greatly reduced recharge rate must be provided. This is important because the simulated capture zone achieved for a given rate of pumping will be very sensitive to the recharge rate applied.

Calibration

Appendix A did not present detailed calibration of the model to conditions with long term continuous site pumping. Since the model is being used to predict the effects of such pumping, a detailed calibration should be presented for conditions both with and without recovery pumping operational.

SPECIFIC COMMENTS

Page	Comment
A2- I	The "Deep Conductive Zone" identified by CDM is not explicitly included in the conceptual stratigraphy or the model. Some model detail is lost by lumping this unit within a more general "Principal Aquifer".
Table A2- I	Well DMW-3 is listed for both the lower Principal Aquifer and Deep Bedrock.
A2-2	The "Upper Bedrock Aquitard" may not merit the "aquitard" designation. The vertical hydraulic conductivity of 0.2 to 0.3 feet/day ascribed to this unit is not so different from that ascribed to the "Principal Aquifer" of 1foot/day. Similarly, the model horizontal hydraulic conductivities are not so different, 2.5 versus 9.4 feet/day.
A2-4	There appear to be as many data points for the Deep Bedrock as for other stratigraphic units. Is the reason that no flow direction was determined that no consistent gradient is indicated by the data?
A3-2	Representing dipping hydrostratigraphic beds as horizontal grid layers can lead to complications for establishing boundary conditions as described previously.
Fig. A3-2	No scale is provided. It would be helpful to know the width of the subcrops.
A3-3	The statement "Although layer thickness is not centered into the model directly, transmissivity was used to represent the pinching out of Layer 1 on site." needs clarification. Based on Table A3-2, it appears that a constant hydraulic conductivity (not transmissivity) was specified for this layer.
A3-3	What is the basis for assigning "river" boundary conditions at Bound Brook? The model layers dip well below the stream.
A3-3	The General Head boundary condition parameters should be documented, with more explanation of how they were derived.
A3-4	CDM concluded from the base flow analysis that the most reasonable range of

recharge was from 6 to 7. 5 inches/year, not 4 to 7. 5 inches/year.

A3-4 More justification and quantification is needed to support the statement that "The effective recharge to the bedrock units will be considerably less than the estimated 4 to 7.5 inches per year."

A3-4 If the "car wash" well is operating, or might be operating in the future, this may have a significant effect on the capture zone of site recovery wells. It would be helpful if evidence that it is not operating be provided in more detail.

A3-5 A MODFLOW type 3 aquifer is confined/unconfined, not confined as indicated for layer l. Which representation was used?

A3-5 For layer 2, it should probably state that a transmissivity (not hydraulic conductivity) of 1,690 square feet per day was used for the initial run. Elsewhere on pages A3-S and A3-6, the units of transmissivity should be expressed as square feet per day. Based on Table A3-2, layer 2 was probably represented as a type 0 (confined) aquifer, not type 3.

A3-5 For layers 3, 4 and 5, MODFLOW aquifer type 0 is a confined aquifer, not type 3.

A3-6 The initial leakance value of 0.0001/day selected for the Gray Shale units seems very low. Since these units are 10 to 20 feet thick, this leakance corresponds to a vertical hydraulic conductivity of 0.001 to 0.002 feet/day. For comparison, it was previously stated that the Upper Aquitard vertical conductivity was estimated from pumping test data to be 0.2 to 0.3 feet/day, or 2 orders of magnitude higher.

A3-7 References to April 29, 1994 should be changed to August 29, 1994.

A3-7 As discussed above, a more detailed model calibration to conditions with recovery pumping operating should be documented. Comparison of simulated and measured response at a comprehensive set of site monitoring wells should be provided. Comparing model results to target head contours developed from a few data points is not sufficient. In particular, the drawdown cone indicated by the target head contours shown in Figure A3-6 appears to be defined entirely by an estimated head at the pumping well, C-l.

Table A3-1 Water level measurements for a number of the wells shown in Table A2-2 are not included in Table A3-1. No explanation is provided.

Table A3-2 The leakance value of 0.001/day shown for the Upper Aquitard seems low. For a thickness of 20 to 40 feet, this corresponds to a vertical hydraulic conductivity of 0.02 to 0.04 feet/day, compared with a previous estimate based on pumping test data of 0.2 to 0.3 feet/day. This should be explained.

Table A3-2	The leakance values shown for the Upper and Lower Gray Shale units, 0.000014/day and 0.00065/day, are also very low. Selection of these values should be explained.
Table A3-2	As discussed previously, the basis for selecting a recharge rate of 2 inches/year for subcrop areas needs to be quantified. Similarly, the use of a constant inflow rate to the top layer of the model needs to be explained.
Fig. A3-8	Simulated response in the Upper Aquitard and Upper Permeable units are indicated in the legend, but are not graphed.
A3-8	It should be stated how the pumping flux for well C-l is distributed among model layers.
A3-9	Although recharge is shown to be a sensitive model parameter, for many models, it is possible to maintain a satisfactory calibration when adjustments are made to recharge together with adjustments to boundary conditions and/or hydraulic properties.
A4-2	It should be indicated to which model layers fluxes are assigned to represent pumping from well C-l. It is implied that it pumps from the Principal Aquifer only. In fact, well C- 1 probably pumps from the Upper Permeable Aquifer also.
A4-3	The model's ability to represent long-term pumping from well C- 1 was not thoroughly demonstrated in the model documentation.
A4-3	It is not clear how the model uncertainty of plus or minus 30 percent was arrived at.

IV. PUBLIC MEETING COMMENTS AND EPA'S RESPONSES

Questions or comments are summarized in bold, followed by EPA's response.

1. **Several members of the audience expressed their preference for the State of New Jersey cleanup guideline of 0.49 ppm instead of EPA's level of 1 ppm for PCBs in soil.**

   EPA's Response: There are no chemical-specific ARARs for soil. However, the State has developed State-wide soil cleanup criteria that while not promulgated, were considered by EPA in developing cleanup levels for the Site. Based on EPA's guidance, EPA has selected a PCB cleanup level of 1 ppm for soils at the Chemsol Site. The NJDEP's cleanup criterion for PCB contaminated soil in residential areas is 0.49 ppm; it is not legally applicable and EPA believes that a PCB cleanup level of 1 ppm is protective of human health and the environment.

   With the implementation of Alternative S-3, the levels of PCBs remaining in the soil after excavation will not exceed 1 ppm. However, EPA intends on excavating additional soils from three hot spots; these excavations may go as deep as six feet, down to bedrock. With the excavation of these hot spots and by using NJDEP's soil compliance averaging methodology, EPA believes it will achieve the State of New Jersey cleanup guideline of 0.49 ppm.

2. **State Assemblyman Smith asked if the responsible parties have stepped up to the plate, and if so, have they been acting in accord with the Superfund Law.**

   EPA's Response: The responsible parties had spent approximately $10 million on the current interim remedy to date. They have designed, constructed and are currently operating and maintaining the on-site treatment system. At the meeting, EPA also indicated that the responsible parties are complying with the Superfund Law.

3. **Assemblyman Smith asked if there is any reason to believe that the responsible parties would not implement EPA's recommended alternatives, estimated at $18 million.**

   EPA's Response: EPA indicated that the responsible parties have indicated that they are willing to negotiate with EPA the implementation of the Record of Decision.

4. **Assemblyman Smith and Mike Beson, representing Congressman Pallone, asked if the 22 potentially active groundwater wells within a half mile radius of the site were tested for contamination. They also asked EPA to re-sample the wells.**

EPA's Response: Approximately 5 years ago, EPA offered to sample residential wells. Some of the residents agreed, and EPA sampled their wells. Others did not want their wells to be sampled. EPA is willing to sample all wells within the half mile radius of the Site. EPA will coordinate this effort with the Piscataway Health Department.

5. **Assemblyman Smith followed up by making reference to Page 19 of the Proposed Plan, "The State of New Jersey cannot concur on the preferred remedy unless its site direct contact criteria are met or institutional controls are established to prevent direct contact with soils above direct contact criteria." He wanted to know the status of the State of New Jersey's response to EPA's cleanup.**

   Response: Mr. Paul Harvey from the State of New Jersey indicated that they have commented on the Proposed Plan, and the State prefers its 0.49 ppm cleanup criterion for PCBs in unrestricted use areas.

6. **The question was asked, if it was a part of EPA's plan to activate the biological treatment plant and discharge the treated water directly to Stream 1A.**

   EPA's Response: It may eventually happen. Currently, EPA prefers Option A, which calls for discharge of treated groundwater to the Middlesex County Utilities Authority (MCUA). However, the responsible parties are not sure how much longer they will be allowed to discharge the treated groundwater to MCUA. In the event that MCUA stops accepting discharge from the treatment plant, the biological process would be activated. The treated groundwater from the treatment plant would undergo additional treatment (biological treatment) that would enable direct discharge to Stream 1A.

7. **Members of the audience indicated that EPA and the responsible parties should do everything in their power to make sure that MCUA continues to accept the treated groundwater so there would be no discharge to the stream.**

   EPA's Response: No response necessary.

8. **The question was asked about the logistics of trucking 18,000 cubic yards of soil and the risk of contaminated soil becoming airborne or spilling onto the street.**

   EPA's Response: Soil excavation is a relatively standard procedure in the construction industry and that there are standard practices that address the issues such as possible airborne dust and spillage. Health and safety issues would be addressed in the remedial design report. When the treatment plant was being built, monitoring was done to determine the level of dust in the air, especially when trucks travel back and forth on Fleming Street. If the dust levels were too high, work would cease or some form of standard dust suppression measures would be implemented.

9. **A member of the audience indicated that the magnitude of soil to be excavated will be higher than during the construction of the treatment plant and was concerned especially with the close proximity of apartment buildings adjacent to the site.**

EPA's Response: EPA has been involved in several site constructions, especially in the summer when the weather is dry. EPA has done monitoring at these sites and has been successful in implementing dust suppression measures, and can implement the same measures at this site.

10. **Will incineration of the contaminated soil at the Site cause any air pollution problem?**

EPA's Response: EPA did not choose that alternative. At the meeting, EPA indicated that the alternative was not incineration but low temperature thermal desorption and that such a system would be equipped with the necessary devices to eliminate or minimize the release of dust and other pollution to the air.

11. **A home owner asked what can parents expect of children, now adults who twenty years ago played on mounds of dirt and materials at the site, and rode their bicycles freely throughout the site. What is the potential of them coming down with cancer, and what kind of cancer?**

EPA's Response: This question came up at a past public meeting. At that time, EPA indicated that, it was impossible to quantify the risk for exposures so long ago. Based on its studies, EPA can say what the current and future risks are for people going on-site (including children) and if the site is not remediated a year, two years or three years from now. Unfortunately, EPA cannot say what the risks were back in the 1960's and 1970's.

12. **EPA was asked to translate the unacceptable total risk of 2.2 X 10-3.**

EPA's Response: This means that there would be an additional two people in a thousand who can be expected, if they were exposed to the site on a regular basis over a 70 year period, to come down with cancer based on the current exposure at the site.

13. **Has the EPA ever considered conducting a door to door survey to find out how many people in the neighborhood have died of cancer?**

EPA's Response: EPA does not do that type of work. Congress in the last Superfund Law authorized an agency that is part of the Centers for Disease Control, the Agency for Toxic Substances and Disease Registry (ATSDR), to perform such a health evaluation. EPA indicated that it would be willing to put the resident in touch with one of the biological scientists from the ATSDR. EPA held a conference call on September 26, 1997 with

ATSDR to hear the citizen's concerns. During the conference call, the Superfund and health assessment processes were explained to the citizen in detail. A copy of the health assessment that was prepared by ATSDR was forwarded to the concerned citizen.

14. **A resident indicated that from what she has seen at the site, only the plant seems to fenced in.**

    EPA's Response: This is not true. Areas other than the plant are fenced. Lot 1B, the area where industrial activities occurred, has been fenced for at least five years.

15. **The individual followed up the question, asking if that's where most of the contaminants were found.**

    EPA's Response: The majority of the contamination was found in Lot 1B.

16. **A resident made reference to the statement on page 17 of the Proposed Plan regarding EPA bypassing the residential areas (Fleming Street) when trucking out the excavated soil and asked where EPA would locate such a road.**

    EPA's Response: EPA indicated the proposed road location on a map to the audience. The proposed road will be located in the southeast portion of the site, next to the Port Reading Railroad Line. EPA was then urged to work with the Mayor's Office in ironing out details if such a temporary road had to be built. EPA indicated that it would cooperate with the local authorities to ensure that the community is impacted as little as possible during construction activities.

17. **The statement was made by the Councilman that the responsible parties should absorb the cost for sampling the local residential wells and for hooking up such residents to the city water system as necessary.**

    EPA's Response: EPA will perform additional sampling of local residential wells to see what impact the Site has had since EPA's last sampling activities. EPA will ask the Potentially Responsible Parties (PRPs) to either perform the sampling activities, or to pay the cost if EPA performs them.

18. **A member of the audience asked to be provided with a list of the Safe Drinking Water Act MCLs for the contaminants listed on page 6 and 7 that were found in surface and subsurface soils and groundwater.**

    EPA's Response: This information is available in Table 1-12 of the feasibility study report which is available in the repository, located at the Kennedy, Library, 500 Hoes Lane, Piscataway, NJ.

19. **With the high level of removal of organic contaminants, as indicated in the data, is there a reason why the sewer authority would not let you continue to pump basically potable water to the sewer.**

EPA's Response: The Middlesex County Utilities Authority (MCUA) is authorized to make the determination as to what material it will accept. At times, there are concerns on the part of the sewer authority on how much capacity they have to handle Superfund waste. EPA cannot comment on the sewer authority's decision making process in this matter.

20. **EPA was asked if the 50 gallons per minute of groundwater that the treatment plant would be handling was excessive and if it was a case of the sewer authority not being able to handle it.**

EPA's Response: EPA has no reason to believe that the sewer authority cannot handle the increased flow from the selected remedy.

21. **Are soils contaminated with PCBs at the same location (hot spots) with other contamination?**

EPA's Response: Yes, they are co-located.

22. **If the soils were to be excavated, is there a possibility that volatiles may enter the air while the soil is being placed in the truck?**

EPA's Response: Such a possibility does exist. However, EPA will take all precautions to ensure that the public is not exposed to any hazardous materials during construction.

23. **Will trucks transporting the excavated soils be completely sealed to eliminate VOCs emission from the soil or will only a tarp be placed over the trucks?**

EPA's Response: No decision has yet been made, but as the excavation proceeds, there will be procedures to monitor dust and organic emissions and contingencies to address any such elevated levels. The main suppression methods used in the past have been water and/or use of a tarp to cover the vehicle.

24. In trucking the material off-site, will EPA just be disposing of the material or will it be treated?

EPA's Response: EPA does not expect that treatment will be necessary prior to off-site disposal. PCBs are present at the Site in concentrations as high as 310 parts per million. Under the Toxic Substances Control Act (TSCA) law, soil contaminated with these levels can be disposed of at landfills without any treatment. For other contaminants found in the soil, all contaminants are at levels that would not require any treatment pursuant to Resource Conservation and Recovery Act (RCRA) requirements. EPA also performed Toxicity Characteristic Leaching Procedure (TCLP) tests to determine if the contaminated soils could be disposed at a RCRA landfill. The samples tested passed the TCLP tests which indicates that the Site soils can be disposed at a RCRA landfill without prior treatment.

25. An individual concerned with sedimentary toxicity, asked if an ecological risk assessment was performed.

EPA's Response: An ecological risk assessment was performed. It involved a qualitative and/or semi-quantitative appraisal of the actual or potential effect of a hazardous waste site on plants and animals. A four-step process is utilized for assessing site-related ecological risks: *Problem Formulation* - a qualitative evaluation of contaminants release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. *Exposure Assessment* - a quantitative evaluation of contaminant release, migration and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. *Ecological Effect Assessment* - literature reviews, field studies, and toxicity tests, linking contaminant concentration to effects on ecological receptors. *Risk Characterization* - measurement or estimation of both current and future adverse effects.

26. As a follow-up, the individual asked if there are heavy metals in the sediment and if so, would a release of 50 gallons per minute of treated groundwater to the streams increase the toxicity of the stream by stirring up the contaminants in the sediments.

EPA's Response: The contamination is primarily in Stream 1B which is an intermittent ditch and does not have flow at certain times of the year. The treated groundwater would be released to Stream 1A, not to Stream 1B, and therefore would not be stirring up contaminated sediments.

27. A individual asked if EPA would be excavating Lot 1B, or both Lot 1B and 1A.

EPA's Response: It was indicated that most of the soil to be excavated will come from Lot 1B, but that some soils from Lot 1A will also be excavated.

28. **The question was followed up as to at what depth would excavation take place.**

EPA's Response: The depth of excavation varies from area to area based on testing performed in the remedial investigation. For some areas, EPA will excavate to two feet, others, four feet and six feet.

29. **The question was asked if six feet was the deepest depth EPA was planning to excavate.**

EPA Response: That is correct based on data available at this time.

30. **The same individual asked how soon after excavation could houses be built, or would one have to wait 30 years for the groundwater remedy to be completed.**

EPA's Response: One would not have to wait 30 years for the groundwater to be cleaned up before houses could be built at the Site. Upon excavation of the contaminated soils followed by backfilling with clean fill, houses could be built. However, the NJDEP may require some deed restrictions on the Site if its PCB cleanup criterion of 0.49 ppm is not achieved.

31. **Follow -up question. With the allotted time being 30 years, would it take that time to be deleted from the NPL or could it be deleted before 30 years.**

EPA's Response: The 30 year timeframe mentioned in the Proposed Plan for groundwater pump and treat may not be an accurate estimate of how long it will take to clean up the site. The 30 year timeframe is used for costing purposes only. It is very difficult, if not impossible, to predict exactly how long it will take to clean-up the groundwater at the site. The Site cannot be deleted from the National Priorities List (NPL) until no further groundwater response is appropriate. Due to the complex nature of the fractured bedrock found at the Site, contaminants get trapped in spaces and are very difficult to remove. EPA intends to pump as much water, very aggressively into the treatment plant to remove the contaminants, and to minimize the potential for the contaminants from leaving the facility boundaries.

32. **The same individual was interested in knowing if after performing the five year review and the groundwater has been cleaned up, would the site be ready for houses?**

EPA's Response: The Site could be used for building houses before the groundwater is cleaned up, providing it does not interfere with the remediation and no potable wells are installed or utilized. However, as mentioned earlier, EPA's cleanup criteria for soils contaminated with PCBs is 1 ppm and the NJDEP's cleanup criteria is 0.49 ppm. So even though the soils will achieve EPA's cleanup criteria, the State of New Jersey may restrict some uses of the Site if its cleanup criteria are not achieved.

33. **The same individual asked how deep is the groundwater and soil contamination.**

EPA's Response: Based on current data, the groundwater contamination goes down several hundred feet and the soil contamination goes as deep as 6 feet.

34. **The questioner was interested in determining the risk if houses were built at the site since excavation would only go as deep as six feet and in certain area the soil contamination is as deep as ten feet, possibly leaving some contaminated soils on-site.**

EPA's Response: Based on EPA's risk assessment, soils below two feet at the Site do not pose any cancer or non-cancer threats associated with residential use. However, there is a small pocket of soil around borings 74 and 76 with levels of VOCs that are higher than the remaining subsurface soils. This area, if not removed, will continue to be a source for future groundwater contamination. Based on EPA's proposed remedy, this area of contamination would be excavated down to six feet, where the contamination exists, then disposed of off-site. Therefore, the subsurface soils would not pose any risk to future development of houses at the Site.

35. **An individual was interested in knowing where Streams 1A and 1B go after leaving the site.**

EPA's Response: EPA indicated that both streams flow to New Market Pond, which ultimately flows into the Bound Brook. The Bound Brook eventually flows into Raritan River.

36. **The individual followed up her question asking if EPA intends to do off-site testing of the streams to be sure that contamination has not left the site.**

EPA's Response: Elevated levels of PCBs were detected in portions of the streams. It is not clear if the PCB concentration in the stream sediments represent actual source areas of contamination or indicate the presence of a migration pathway for contaminants from the more heavily contaminated Lot 1B. In addition, ecological risks associated with PCBs are minimal. Therefore, remediation of the streams is not warranted at this time. Rather, monitoring is required to determine whether remediation of Lot 1B results in a lowering of PCB levels in the streams in Lot 1A.

37. **The question was asked, since a railroad track exists next to the track, EPA should consider disposing of the excavated soils by rail.**

EPA's Response: EPA evaluated this option, and though 18, 000 cubic yards of soil seems like a large volume of soil, it is often quicker and more economical to transport the soil by truck than by rail.